DECEMBER 29, 1934

Railway Age

Founded In 1856

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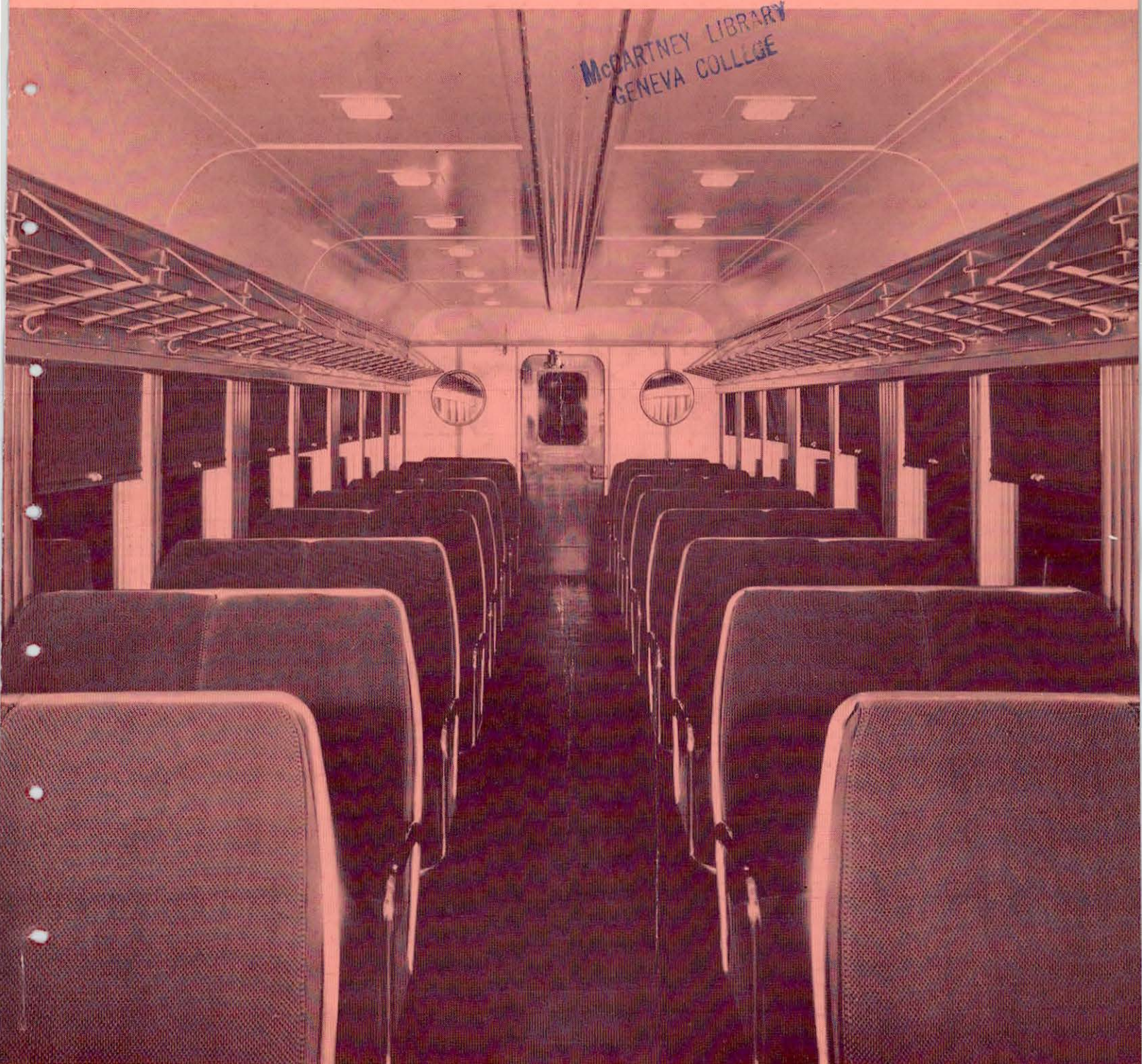
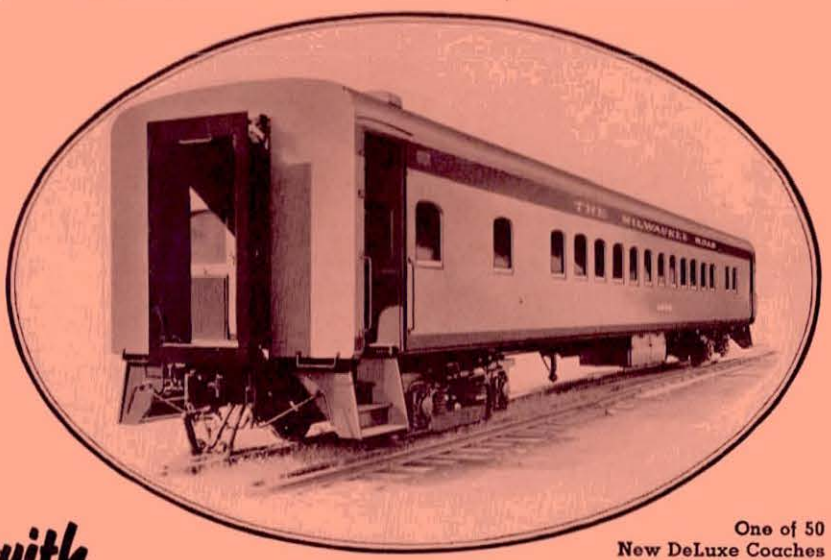


An interior view of one of the fifty modern light-weight passenger cars being delivered to the New Haven, a description of which will appear in an early issue of this publication

CHICAGO MILWAUKEE ST. PAUL AND PACIFIC

NEW LIGHT WEIGHT PASSENGER CARS



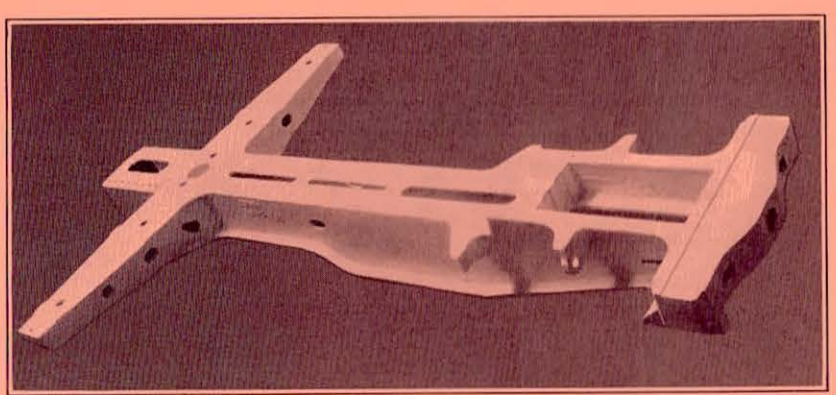
One of 50
New DeLuxe Coaches
Wt. 105,000 lbs.

Safety . . .

Strength . . .

Riding Comfort . . . with

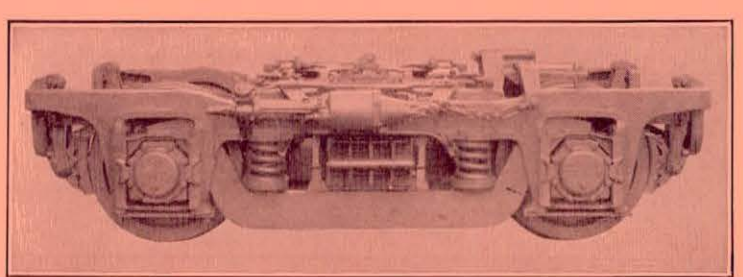
COMMONWEALTH PLATFORMS AND TRUCKS



Cast Steel Combined Platform and Body Bolster for New Milwaukee Coaches

MAXIMUM STRENGTH
WITH LEAST WEIGHT
•
MINIMUM
MAINTENANCE COSTS

NEW TRUCK OF LIGHT WEIGHT
WITH GOOD RIDING QUALITIES



Cast Steel Truck, Equalized—Swing Motion Type, Equipped with Unit Type Brake, for New Milwaukee Coaches

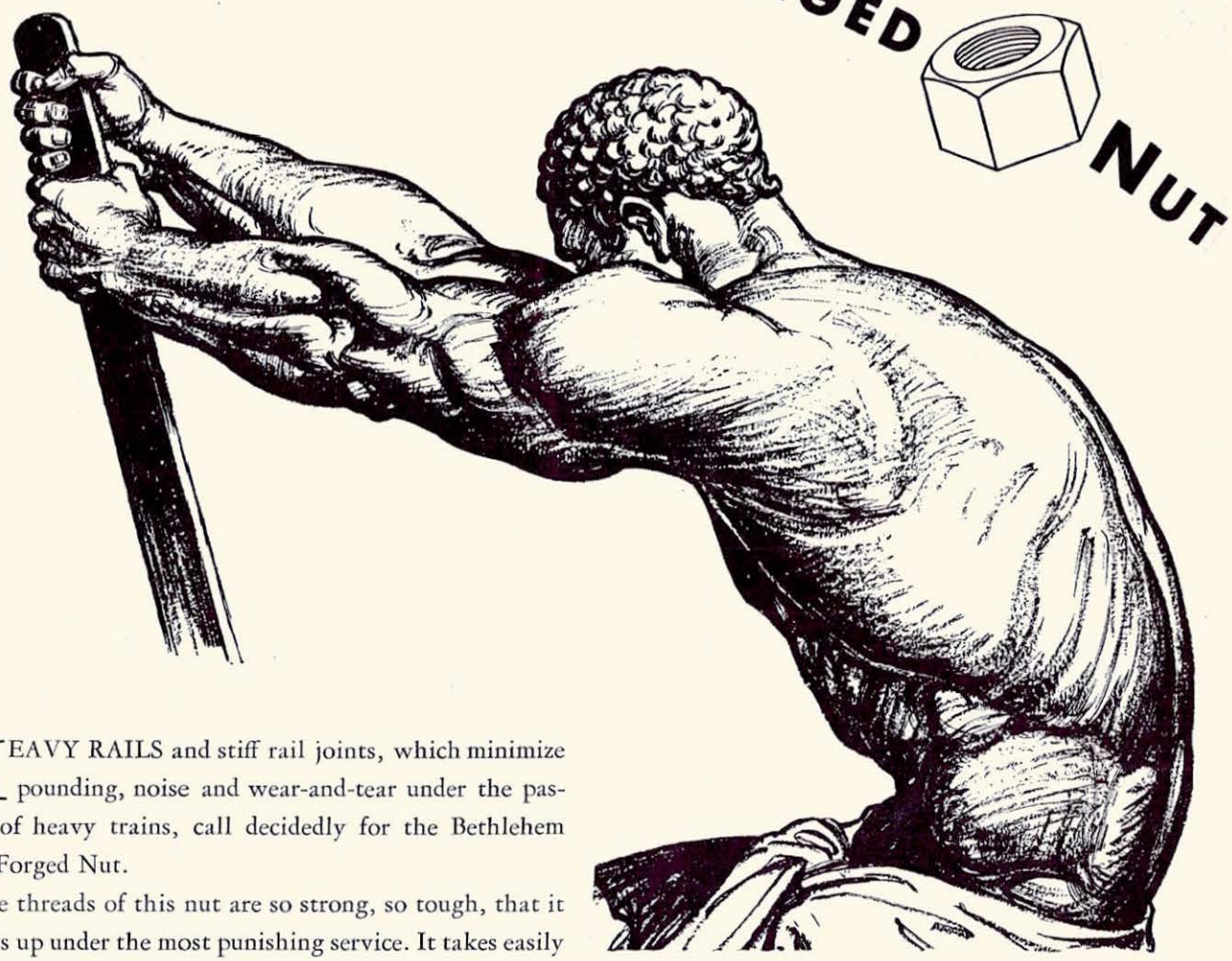
GENERAL STEEL CASTINGS CORPORATION

COMMONWEALTH PRODUCTS

EDDYSTONE, PA. GRANITE CITY, ILL.

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter. January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

Why railroads need this HOT-FORGED NUT



HEAVY RAILS and stiff rail joints, which minimize pounding, noise and wear-and-tear under the passage of heavy trains, call decidedly for the Bethlehem Hot-Forged Nut.

The threads of this nut are so strong, so tough, that it stands up under the most punishing service. It takes easily heavy wrenching stresses and sharp, sudden lateral thrusts from the springing of a heavy joint under load. Used with heat-treated track bolts, Bethlehem Hot-Forged Nuts form a fastening of matched quality.

Use Bethlehem Hot-Forged Nuts in cars and engines, in switches and frogs, as well as in rail joints—in fact, wherever conditions call for an extra-strong nut with tough threads. These nuts are forgings, with the added strength and toughness that forging gives. They don't split, nor round out, nor "mushroom." They're the logical nuts to use for every heavy-duty job.

Bethlehem Hot-Forged Nuts are made at our Lebanon, Pa., Plant, where Bethlehem Track Bolts, noted for their uniform, high strength, are also made. In addition, Lebanon Plant makes related products for every railway requirement. Frog bolts, engine bolts, staybolts and superheater bolts. Corrosion-resisting bolts. Track spikes, made from new-billet steel. Rivets. Turnbuckles. And many special items.

For service to you, Bethlehem carries at Lebanon an extensive range of standard commercial items ready for immediate shipment.

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BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

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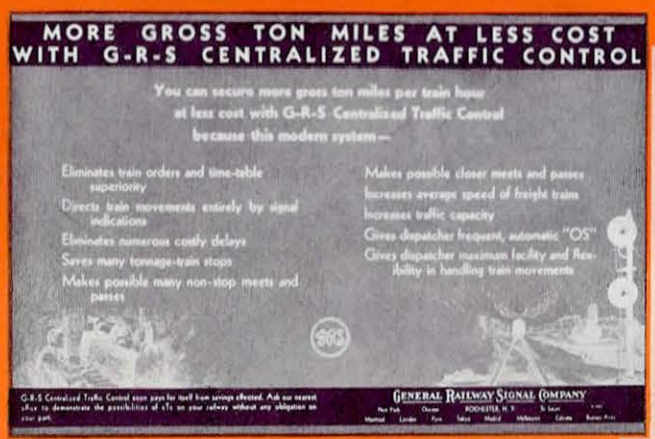
District Offices: Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul, Washington, Wilkes-Barre, York. *Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Seattle, Los Angeles, Portland and Honolulu. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

THESE SYSTEMS AR

For Better and More Economical Operation Include These Systems in Your 1935 Budget

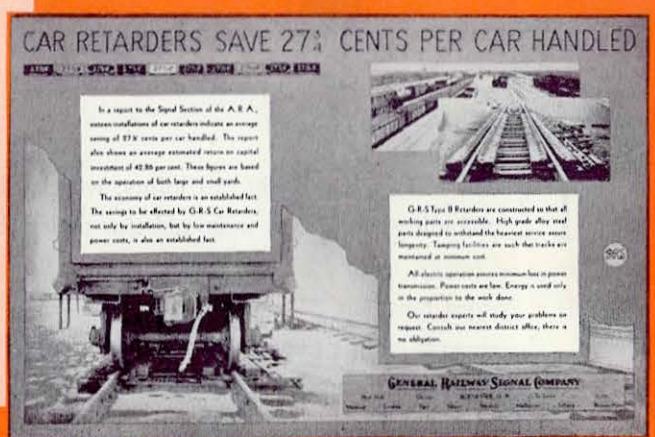

MORE GROSS TON MILES AT LESS COST
WITH G-R-S CENTRALIZED TRAFFIC CONTROL
You can secure more gross ton miles per train hour at less cost with G-R-S Centralized Traffic Control because this modern system—
Eliminates train orders and time-table superiority
Directs train movements entirely by signal indications
Eliminates numerous costly delays
Serves many tonnage-train stops
Makes possible many non-stop meets and passes
Makes possible closer meets and passes
Increases average speed of freight trains
Increases traffic capacity
Gives dispatcher frequent, automatic "OS"
Gives dispatcher maximum facility and flexibility in handling train movements
GENERAL RAILWAY SIGNAL COMPANY

CENTRALIZED TRAFFIC CONTROL

31 G-R-S INSTALLATIONS SHOW NET RETURNS UP TO 115 PER CENT.

CAR RETARDERS

AN AVERAGE RETURN OF 42.86 PER CENT IS REPORTED BY A.R.A., SIGNAL SECTION, BASED UPON ECONOMIC STUDIES OF 16 INSTALLATIONS.



ELECTRIFY YOUR OUTLYING SWITCHES
AND ELIMINATE TONNAGE-TRAIN STOPS
You can eliminate delays, reduce operating costs and increase gross ton miles per train hour by equipping outlying switches with G-R-S Remote Control.
G-R-S Remote Control makes it possible to operate passing-siding switches, ends of double track, junctions, crossings, yard entrances and exits and similar layouts several miles or more distant from a convenient control point.
G-R-S Remote Control is self-liquidating and soon pays for itself from savings effected.
A. R. A. Committee Report shows average net return of 50 per cent on investment for 14 installations reported.
GENERAL RAILWAY SIGNAL COMPANY

REMOTE CONTROL

A.R.A., SIGNAL SECTION, REPORT SHOWS NET RETURNS UP TO 591 PER CENT OR AVERAGE RETURN OF 50 PER CENT.

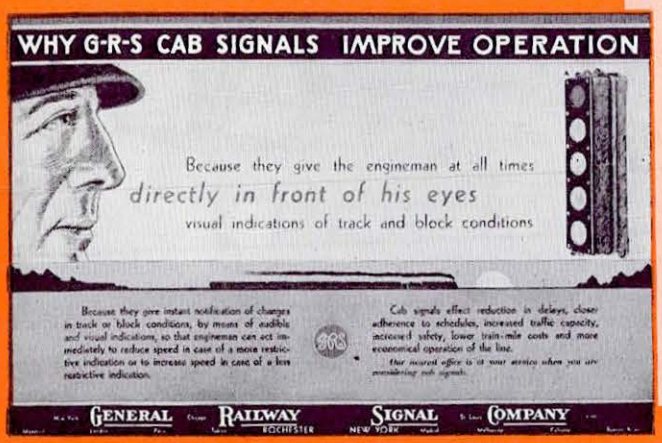
THESE SYSTEMS AR

E SELF LIQUIDATING

ELECTRIC INTERLOCKING

NET RETURNS UP TO 101 PER CENT AND AVERAGE RETURN OF 24 PER CENT ARE REPORTED BY A.R.A., SIGNAL SECTION, BASED UPON ECONOMIC STUDIES OF 15 INTERLOCKING CONSOLIDATIONS.

YOU CAN SECURE SUBSTANTIAL ECONOMIES
BY CONSOLIDATING TWO OR MORE INTERLOCKINGS
INTO ONE G-R-S ELECTRIC INTERLOCKING
At many points, within a radius of a few miles, there are two or more old interlockings in need of a general overhauling or replacement. The replacement of such old interlockings with one modern G-R-S Electric Interlocking is usually cheaper than rebuilding the old plants and effects a substantial reduction in operating expenses as well as improved facilities for expediting traffic.
G-R-S Electric Interlocking offers many possibilities for substantial economies in interlocking consolidations which our nearest office will gladly explain without obligation.
GENERAL RAILWAY SIGNAL COMPANY


WHY G-R-S CAB SIGNALS IMPROVE OPERATION
Because they give the engineman at all times
directly in front of his eyes
visual indications of track and block conditions
Because they give instant notification of changes in track or block conditions, by means of audible and visual indications, so that engineman can act immediately to reduce speed in case of a more restrictive indication or to increase speed in case of a less restrictive indication.
Cab signals effect reduction in delays, closer adherence to schedules, increased traffic capacity, increased safety, lower train-mile costs and more economical operation of the line.
GENERAL RAILWAY SIGNAL COMPANY
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CAB SIGNALS

3855 MILES OF ROAD OR 7863 MILES OF TRACK OPERATED BY CAB SIGNALS ON JAN. 1, 1932. THE NEED FOR CAB SIGNALS INCREASES WITH HIGHER SPEED AND GREATER DENSITY OF TRAFFIC.

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NET RETURNS UP TO 113 PER CENT REPORTED BY A.R.A., SIGNAL SECTION, BASED UPON ECONOMIC STUDIES OF 144 INSTALLATIONS.

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INSTALL G-R-S FLASHING COLOR-LIGHT SIGNALS
On account of the enormous growth of automobile traffic, the cost of highway crossing protection is a considerable item which is steadily increasing.
You can substantially reduce the cost of crossing protection by replacing crossing watchmen and gates with G.R.S Flashing Color-Light Signals which operate automatically and display an intensive, attentive indication of approaching trains. Also they give 24-hour-a-day protection every day of the year.
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Ask our nearest office for information about the economy of G-R-S Crossing Protection
GENERAL RAILWAY SIGNAL COMPANY

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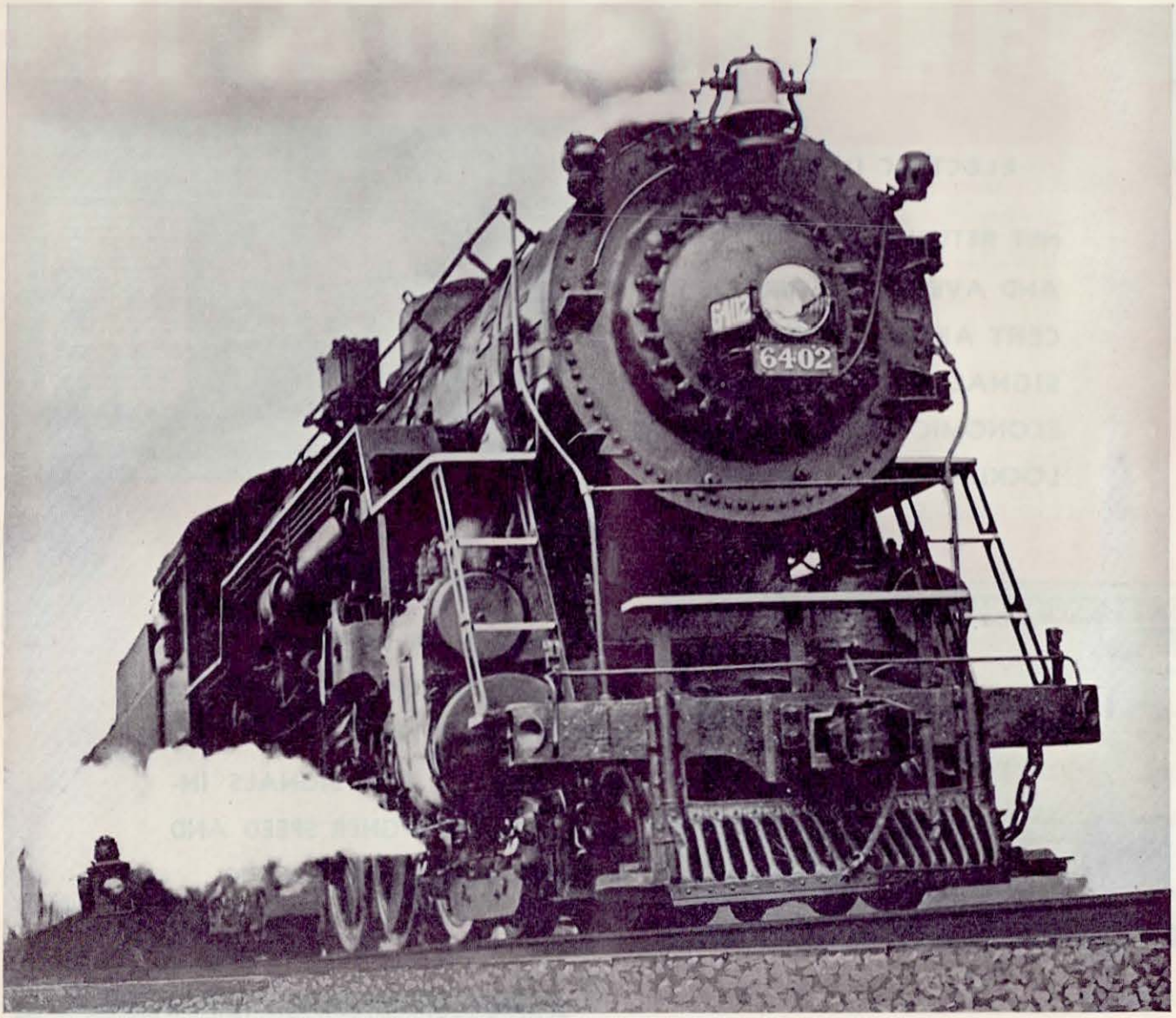


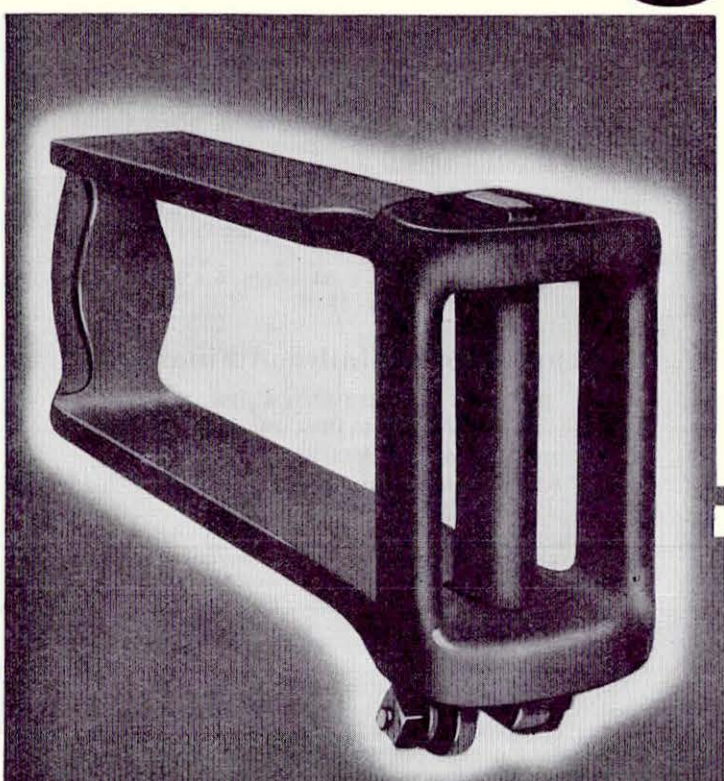
To our many railroad friends—

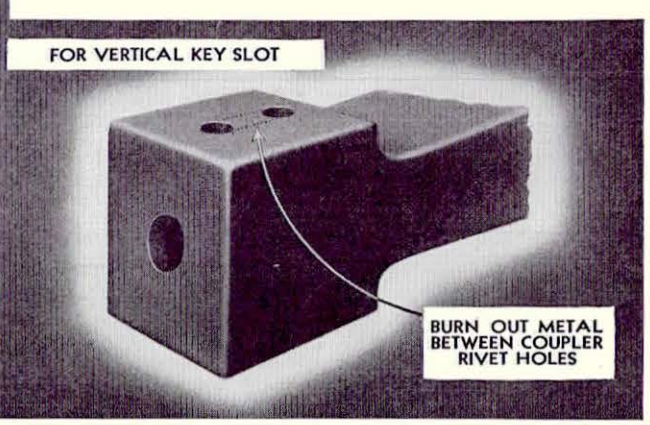
A HAPPY *and* PROSPEROUS NEW YEAR 1935

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

JANNEY

VERTICAL KEY YOKE





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LESS MAINTENANCE

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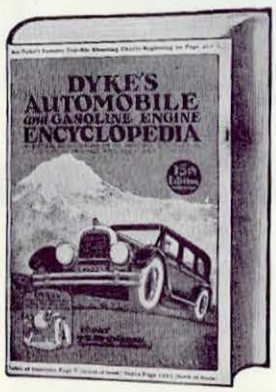

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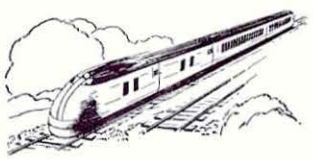

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1,887,582	1,949,640	1,978,795	1,985,636
1,917,006	1,952,833	1,978,854	1.985,910

This company also holds "Comfort" rights under all patents of Auditorium Conditioning Corp. and exclusive "Industrial" rights covering the most acceptable methods for cooling and conditioning industrial plants.

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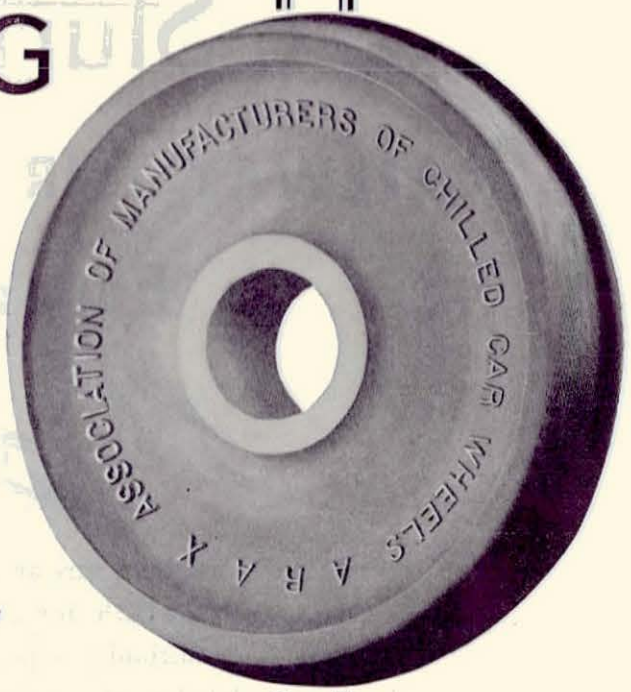

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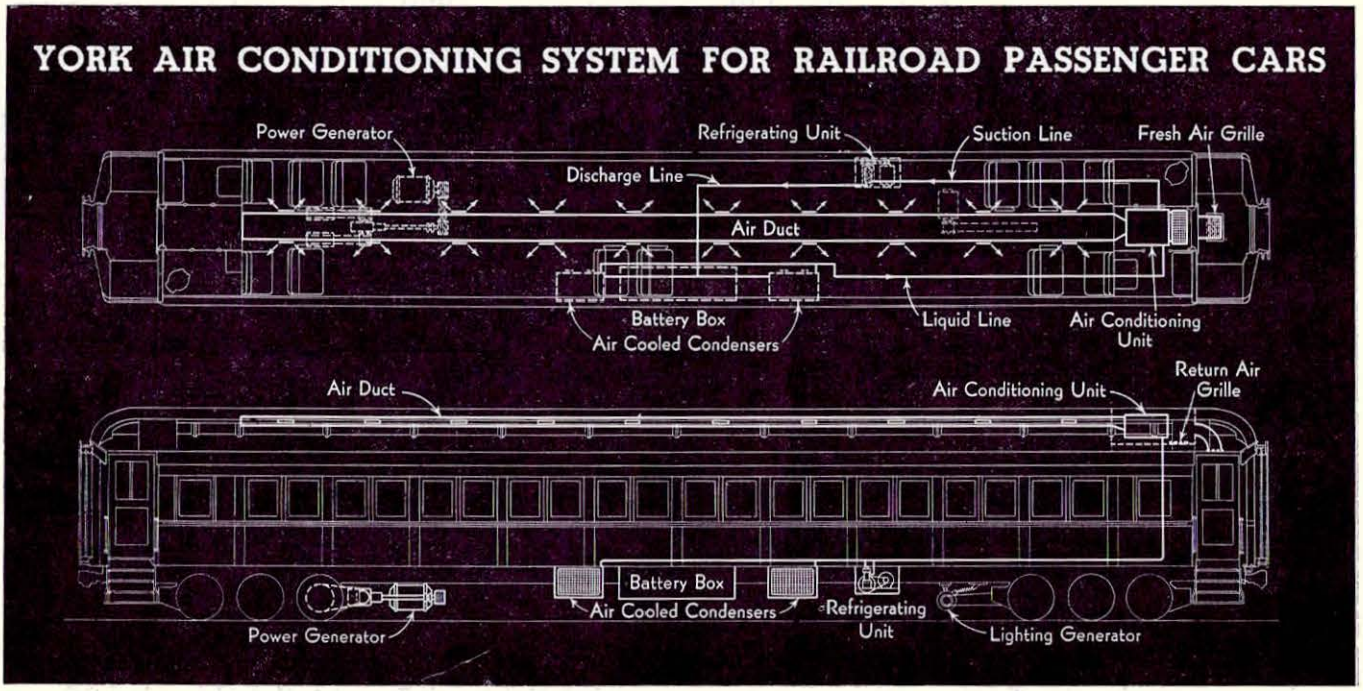
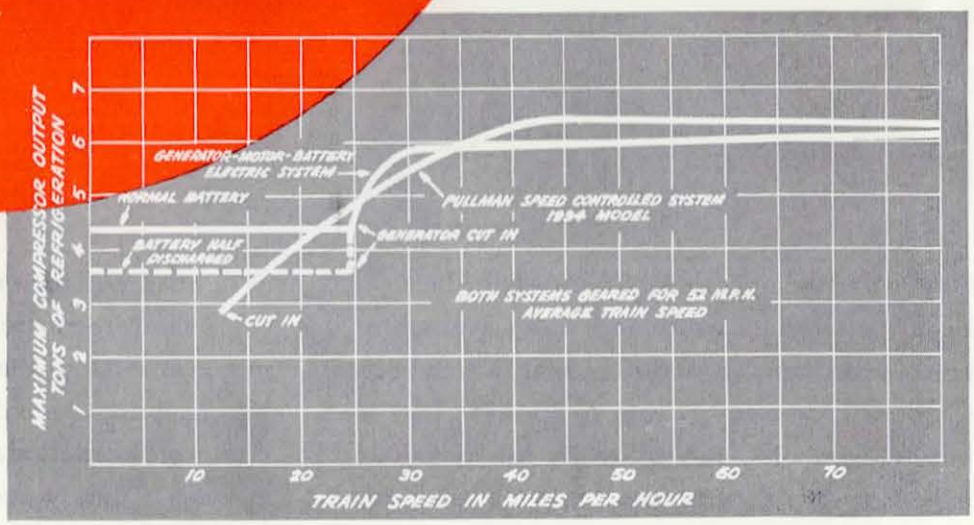


AIR CONDITIONING DIVISION • YORK ICE MACHINERY CORPORATION • YORK, PA.

ADEQUATE CAPACITY FOR SLOW TRAIN OPERATION

Showing the maximum capacity of a Direct Drive Pullman compressor and of a generator-motor-battery driven compressor. Tests show that a compressor operating off a battery runs between 60% and 75% capacity.



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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 97 December 29, 1934 No. 26

NRA U.S. CODE GRAPHIC ARTS INDUSTRY

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A description of the five partially streamlined locomotives with 80-inch drivers which were recently delivered to this road by the Lima Locomotive Works.

Progress in Track Maintenance Must Continue 853

H. S. Clarke, engineer maintenance of way of the Delaware & Hudson, holds that long rails with welded joints are practicable and offer large economies.

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F. J. Lisman tells how intelligent cooperation of public authorities, investors, railway managements and labor can vastly improve conditions.

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The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

In cooperation with the railroads, Republic metallurgists have made an extensive study of staybolts. » » » What causes staybolt failures? What precautions can be taken to prevent them? What qualities should be possessed by staybolt materials? » » » These and other topics are discussed in "The Staybolt Question." Copies of this booklet are available to any railroad man. With this study as a background, Republic is well prepared to supply Agathon Alloy Staybolt materials that will give longer service and lower maintenance costs.

CENTRAL ALLOY DIVISION, MASSILLON, OHIO

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REPUBLIC STEEL
CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO

AGATHON STEELS

RAILWAY AGE

The Recovery Program Of Business Leaders

Almost one hundred business leaders selected by the National Association of Manufacturers and the Chamber of Commerce of the United States met at White Sulphur Springs last week and adopted a series of resolutions regarding the present economic problems of the United States. This business platform for recovery is equally significant in its strength and weakness.

Business men regard professional economists as too theoretical. Any small committee of leading professional economists could, however, have drafted a better recovery program. The reason is, that the problems dealt with are economic, and there is a difference between business and economic problems that makes the latter very difficult for business men to face squarely. Problems of business relate to the means of reducing losses or increasing profits in a particular company or industry. Problems of economics relate to the means of co-ordinating and balancing many or all activities of production and distribution. Business men are accustomed to thinking in terms of their own company or industry. Economists are accustomed to studying the broader problems of co-ordination and balance.

A program formulated by economists might have received little attention or backing from business, but unfortunately the program adopted by the business leaders betrays conflicts of opinion due to supposed or real conflicts between the interests of different industries that weaken it as a means of accomplishing the only vitally important national objective—increase of the total volume of production and commerce in the United States. These conflicts of opinion caused compromises in some cases, evasions in others and omissions in others which make the platform of little or no value with respect to several of the nation's most important economic problems. This is natural, but it is not helpful. The document is very much better than no pronouncement at all from business. It is also much less constructive and valuable than it might have been made if those drafting it had not, like politicians, been influenced so much by narrow considerations of self-interest.

Concerning Transportation

An outstanding example of the attempts made to say something about important problems that would promote recovery without saying anything that might be construed to favor any particular industry is afforded by the resolution regarding transportation. The railroads were invited to be represented but decided not to be. This may or may not have been a wise decision by them. "The continuing improvement of our systems of transportation," says the transportation resolution, "is conducive to economic recovery and essential to the promotion of community prosperity. . . . The achievement of maximum efficiency demands freedom for development in each field of transportation." These statements obviously are susceptible of almost any interpretation that spokesmen of the railroads, on the one hand, and spokesmen of competing carriers, on the other hand, may choose to give them.

Perhaps the most important phrase quoted is "freedom for development in each field of transportation." But what does it mean? The railways furnish their own highways and are regulated. Operators of boats, trucks and buses are furnished their highways by the taxpayers and are not regulated. It would be necessary to equal freedom for development for each of them to be required to furnish its own highways and that none of them should be regulated. Is this what the resolution was intended to advocate? If the words used had been "equal freedom for development" they could have been construed favorably to the transportation policies advocated by the railways. The omission of the word "equal" makes the language used susceptible of interpretation favorable to the transportation policies advocated by the competitors of the railways.

Government Competition

In other resolutions appear such statements as "Government competition dries up the sources of its own support. Government competition with private business leads toward socialism. . . . Such competition disregards many recognized elements of citizenship. When it employs the taxes of the citizen to menace his enterprise it threatens the security of his job, the safety of his savings and converts his compulsory support of his government through taxation into a weapon for his injury." Every statement just quoted sounds like a condemnation of present government transportation policies. When the government builds a waterway or highway and lets it be used in competition with the

railways without charging adequate tolls or rentals for its use the government becomes a partner in the business of conducting transportation in competition with the railways. It taxes the owners and employees of the railways to "menace the enterprise" on which they are dependent, it "threatens the security" of their jobs and the "safety of their savings," and it "converts their compulsory support of their government through taxation into a weapon for their injury."

Unfortunately, the conference did not so formulate its resolutions as to make clear whether it meant these statements to apply to transportation as well as other industries. If it did not, then its attitude toward transportation and other industries was wholly inconsistent. If it did, then in effect it advocated the same principles and policies of equal treatment for all carriers that the railways advocate and by implication condemned the numerous business men who persist in selfishly demanding regulation and no subsidies for railways and subsidies and no regulation for carriers by air, water and highway.

Relief, Public Works and Government Budget

The conference advocated relegation of relief as much as practicable to state and local governments and direct relief payments always lower than rates paid for work relief. It advocated expenditures and employment only upon useful public construction and wages for relief work always substantially lower than the going rate for similar work in private industry. It favored these policies as means both of encouraging the unemployed to accept employment in industry and of reducing the expenditures of the federal government and balancing its budget in the fiscal year 1936. It declared that "definite evidence of a determined effort of Congress and the administration to balance the budget, including both ordinary and emergency expenditures, at the earliest possible date is fundamental to any real or lasting improvement in economic conditions," and that equilibrium of the budget should be attained primarily by reducing expenditures and not by increasing taxation. These views will be endorsed by every sound economist because the road now being traveled by the government plainly leads straight toward bankruptcy and uncontrollable currency inflation. The opposition expressed to "arbitrary determination and limitation of hours and wages as proposed in such measures as 30-hour bills" will also be endorsed by every real economist.

Restricted Production and High Costs?

The conference was less constructive in its treatment of the problems being dealt with by AAA and NRA. It recognized the fact that "one of the major factors which brought about the depression was a maladjustment between agriculture and other industries," but it suggested no plan for reducing tariffs and removing other causes that created this maladjustment. The policy advocated by it seems to be one of merely curtailing agricultural production enough to raise farm prices sufficiently to enable agriculture to buy the products of industries that are to be given opportunity to pay high wages and charge high prices in a protected American market. This seems to be a policy of economic nationalism which, by restricting both imports to and exports from the United States, would permanently prevent payment of the principal and interest of foreign debts owing to the government and people of this country and the complete restoration of prosperity to which a revival of foreign trade is essential.

The notable lack of any adequate reference to the NRA policies of reducing competition and advancing wages and production costs and prices in industry supports the view that, on the whole, policies of economic isolation of the United States are favored. This may look like sound business for some industries, but it is not sound economics for the nation. Sound economics for the nation require government and business policies favorable to the largest practicable volume of production and commerce. The policies of curtailing agricultural production, of curtailing competition in any but a few national resources industries and of maintaining tariffs which, by restricting imports will also restrict exports, are incompatible with restoration and increase of the pre-depression volume of production and commerce.

The Durable Goods Industries

That the revival of the durable goods industries is essential to restoration of prosperity was, of course, emphasized. "A free flow of private capital into private business, a sound real estate mortgage market, low construction costs necessitating removal of artificial restraints curtailing volume and increasing costs, whether of material or labor" were mentioned as among the chief fundamental conditions needed for recovery in the durable goods industries. This does not adequately state the case. An increase of the profits of the industries, including the railroads, that do most of the buying from the durable goods industries, and the restoration of confidence that reasonable profits will be allowed to be earned by all well-managed industries, is the prime essential to revival of the capital goods industries, which constitute the largest part of the durable goods industries. Perhaps the conference feared it would get a bad reaction from radicals and labor leaders if it strongly emphasized the need of increase of actual and prospective profits and of adoption of policies to this end by government, business and labor, but profits are the crux of the entire problem of reviving the capital goods industries.

The Resumption of Recovery

The conference was held following a period of a few months when the administration had been manifesting an apparent disposition to turn to the "right" and give business a chance to revive itself, and thereby substitute pay rolls for relief rolls and reduce the apparent necessity for large government expenditures and increasing government interference in business. It may

or may not be due to the apparently changed attitude of the administration, but it is a fact that during this period general business again began to revive. The bottom of the recession in business which began in April and continued for seven months was reached in October when car loadings were 45.2 per cent less than the 1925-1929 average and relatively smaller than in any month since May, 1933. In November they turned upward and were larger relatively than in either September or October. In the week ended December 8 they showed a further gain which continued during the week ended December 15 when they were only 38.4 per cent less than the 1925-1929 average, and relatively larger than since the first week in June.

This actual recent upturn in business should be more influential with the administration and Congress than the platform for recovery adopted at White Sulphur Springs. It strongly indicates that recovery has been resumed. Recovery began in the last one-third of 1932 due to no artificial stimulation, but to natural economic causes. It was resumed after the banking crisis in 1933 due to natural economic causes. It has recently been resumed again in spite of various artificial interfering influences and owing to natural causes. It probably will continue and accelerate if not again interrupted by those who value experiment more than experience, and believe more in doping, bleeding and purging than in the curative operation of natural laws.

High Speed Pacific Type Locomotives Received by Boston & Maine

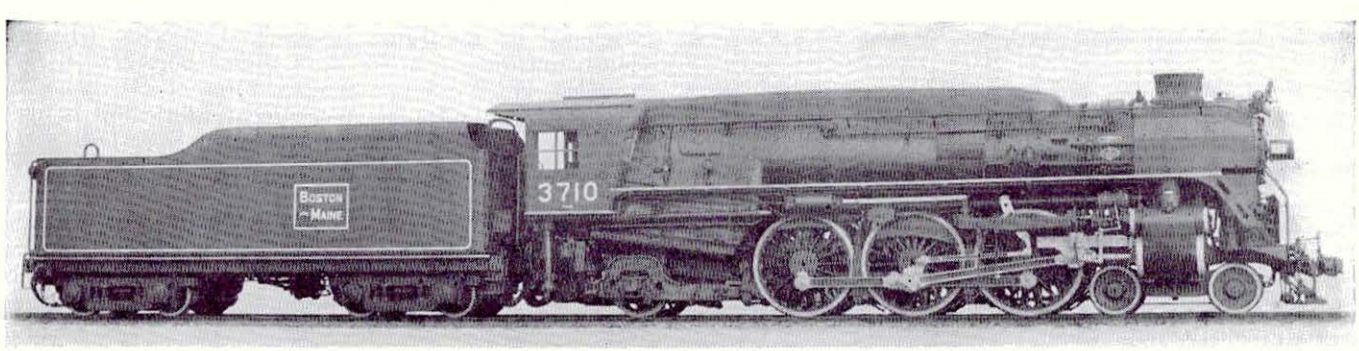
Lima delivers five partially streamlined passenger locomotives with 80-in. drivers

THE Boston & Maine handles a heavy passenger business in the summer season to northern New England mountain and seashore resorts. In order to be prepared to meet more adequately anticipated demands in the coming year an order was placed last May for considerable new equipment, including five Pacific type passenger locomotives to be built by the Lima Locomotive Works, Inc.

All passenger locomotives purchased by the Boston & Maine since 1910 have been of the Pacific type. Those purchased between 1910 and 1916 weighed about 245,000 lb. and had a rated tractive force of 31,600 lb. Cylinders were 22 in. by 28 in.; drivers, 73 in. in diameter, and steam pressure, 200 lb. In 1923 ten additional locomotives were acquired which weighed 263,800 lb. and had a rated tractive force for the main engine of 37,600 lb. These locomotives had 24-in. by 28-in. cylinders, carried 200 lb. steam pressure and had 73-in. drivers. They were equipped with trailer boosters which increased the starting tractive force to 46,975 lb.

The five new locomotives just received, Nos. 3710 to 3714, are known on the road as Class P-4a. They are heavier, carry a higher steam pressure and have larger drivers than any of the previous Pacific type locomotives on the road. They weigh 339,200 lb., exclusive of the tender, of which 209,500 lb. is on the drivers. The steam pressure carried is 260 lb., the cylinders are 23 in. by 28 in., and the driving wheels, 80 in. in diameter, which gives a tractive force for the main engine of 40,900 lb. They are each equipped with a trailer booster which increases the total tractive force to 52,800 lb. In addition to the large drivers and high tractive force required for high speeds, the locomotives have been partially shrouded to reduced wind resistance and have been provided with smoke lifters or deflectors on either side of the smokebox, the purpose of which is to direct the flow of the air when the locomotive is in operation so as to lift the smoke and carry it above the line of the train. Due to restricted clearances the height of the stack has been kept down to 14 ft. 10½ in., width overall to 127 in., and weight per driving axle to 70,000 lb.

The boiler, which is of the extended wagon top type



Boston & Maine High-Speed Pacific Type Locomotive

measuring 75¾ in. outside diameter at the first course, carries 260 lb. pressure. The firebox is 114⅝ in. long by 84 in. wide, which gives a grate area of 66.9 sq. ft. Fuel is bituminous coal, fired by a standard HT stoker. The grates are of the Firebar type. Flexible staybolts are employed in the water space and for the crown. Three Nicholson Thermic Syphons are provided in the firebox on which the brick arch is carried. The fire door is a Franklin No. 8a. There are 203 2¼-in. tubes and 40 5½-in. flues. The superheater is an Elesco Type A, having 966 sq. ft. heating surface. The evaporative heating surface of the firebox, including syphons, is 320 sq. ft. and for the tubes and flues, 3,528 sq. ft., which gives a total evaporative heating surface of 3,848 sq. ft.

Table of Dimensions and Weights of the Boston & Maine 4-6-2 Type Locomotives

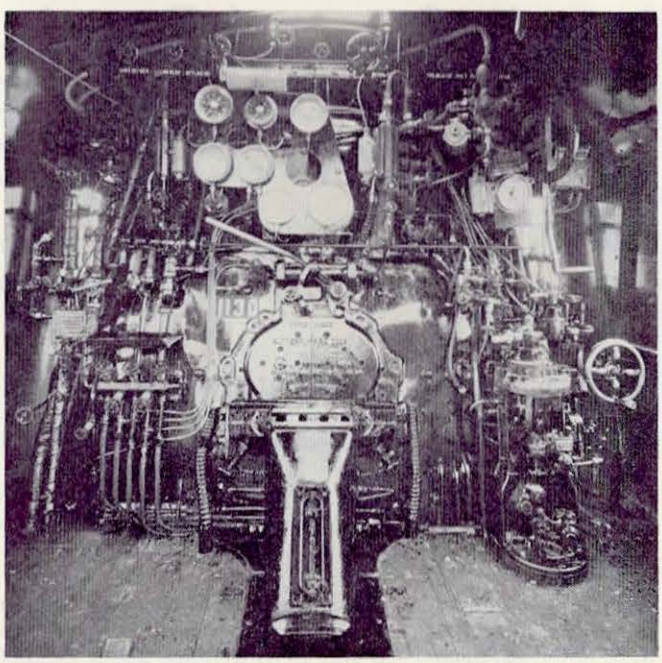
Railroad	Boston & Maine
Builder	Lima Locomotive Works
Type of locomotive	4-6-2
Road class	P-4a
Road numbers	3710-3714
Service	High-speed passenger
Rated tractive force, main engine	40,900 lb.
Rated tractive force with booster	52,800 lb.
Cylinders, diameter and stroke	23 in. by 28 in.
Valve gear, type	Walschaert
Valves, piston type, size	12 in.
Maximum travel	8 in.
Cut-off in full gear	Full stroke
Weights in working order:	
On drivers	209,500 lb.
On front truck	61,400 lb.
On trailing truck	68,300 lb.
Total engine	339,200 lb.
Tender, loaded	240,000 lb.
Wheel bases:	
Driving	14 ft. 0 in.
Total engine	36 ft. 11 in.
Total engine and tender	77 ft. 7 in.
Wheels, diameter outside tires:	
Driving	80 in.
Front truck	36 in.
Trailing truck	49 in.
Boiler:	
Type	Ext. wagon top
Steam pressure	260 lb.
Fuel, kind	Soft coal
Diameter, first ring, outside	75¾ in.
Firebox, length and width	114⅝ in. by 84 in.
Height, mud ring to crown sheet, back	68½ in.
Height, mud ring to crown sheet, front	89 in.
Arch tubes	None
Syphons in firebox	3
Tubes, number and diameter	203-2¼ in.
Flues, number and diameter	40-5½ in.
Length over tube sheets	20 ft. 0 in.
Grate type	Firebar
Grate area	66.9 sq. ft.
Heating surfaces:	
Firebox and comb. chamber	220 sq. ft.
Syphons (3)	100 sq. ft.
Firebox, total	320 sq. ft.
Tubes and flues	3,528 sq. ft.
Total evaporative	3,848 sq. ft.
Superheating	966 sq. ft.
Comb. evap. and superheat	4,814 sq. ft.
Special equipment:	
Brick arch	Yes
Superheater	Type A
Feedwater heater	Coffin
Stoker	Standard HT
Booster	Franklin, trailer
Tender:	
Style	Rectangular
Water capacity	12,000 gal.
Fuel capacity	18 tons

The locomotives are fitted with Coffin feedwater heaters and American multiple type throttles. The exhaust nozzle is an annular ported type developed on the Boston & Maine. Superior flue blowers are also provided.

As will be noted from the illustration all projections and equipment from the sandbox to the cab have been shrouded under an extension of the locomotive jacket. In addition to the sand box, the parts shrouded include the dome, safety valves, turbo headlight generator, and cab turret. The stack is oval in shape with a separate addition on the front side which carries the exhaust from the booster and the boiler feed pump. No attempt has been made to shroud the front of the locomotive or the running gear.

The cab is roomy and fixtures well arranged for convenience of operation. A Loco Valve Pilot is used and the cab is fitted with cab indicating signal equipment of the Union Switch & Signal Company. The air brakes are of the new Westinghouse 8ET type with brake valve and associated parts pedestal mounted. Two 8½-in. air compressors are mounted on the front deck forward of the cylinders. Running boards and front-end ladder steps are of the Kerlow grating type.

The frames are of rugged, built-up construction. The cylinders are cast steel, securely bolted and welded together and also rigidly bolted and welded to the frames. Slightly to the rear of the cylinders is a rigid crosstie, combining in one piece supports for the guides, brackets for driver-brake cylinders and fulcrum brackets for the driver-brake shaft. This crosstie is securely bolted to the frames and extends to the forward pedestal. Timken roller bearings have been applied to the engine-truck axles. The valve gear is of the Walschaert type, operating 12-in. piston valves with a maximum travel of 8 in. Crossheads and guides are of the multiple ledge, modified Laird type. The power reverse gear is a Franklin Precision type, model F1. Alloy steels have been used for main and side rods, crank pins, eccentric cranks and piston rods. The steam-pipe casing is of the Reid type developed by the Lima Locomotive Works. As previously mentioned, a Franklin trailer booster has been provided which exerts a tractive force of 11,900 lb. A Bausch 8-feed, 20-pint, mechanical lubricator is used and all rod fittings are arranged for the Spee-D lubricating device.



Interior of Boston & Maine Locomotive Cab

The tender is of the rectangular type having a capacity for 12,000 gallons of water and 18 tons of coal and weighs 240,300 lb. loaded. It is mounted on a General Steel Castings open-bottom type underframe. The trucks are General Steel Castings equalized four-wheel design, with Isothermos truck boxes. Friction draft gear is Miner Type A-5-Xb. The principal dimensions and weights are given in the accompanying table.

Progress in Track Maintenance Must Continue*

Long rails, with welded joints, held out as practicable and offering large economies

By H. S. Clarke,

Engineer Maintenance of Way, Delaware & Hudson

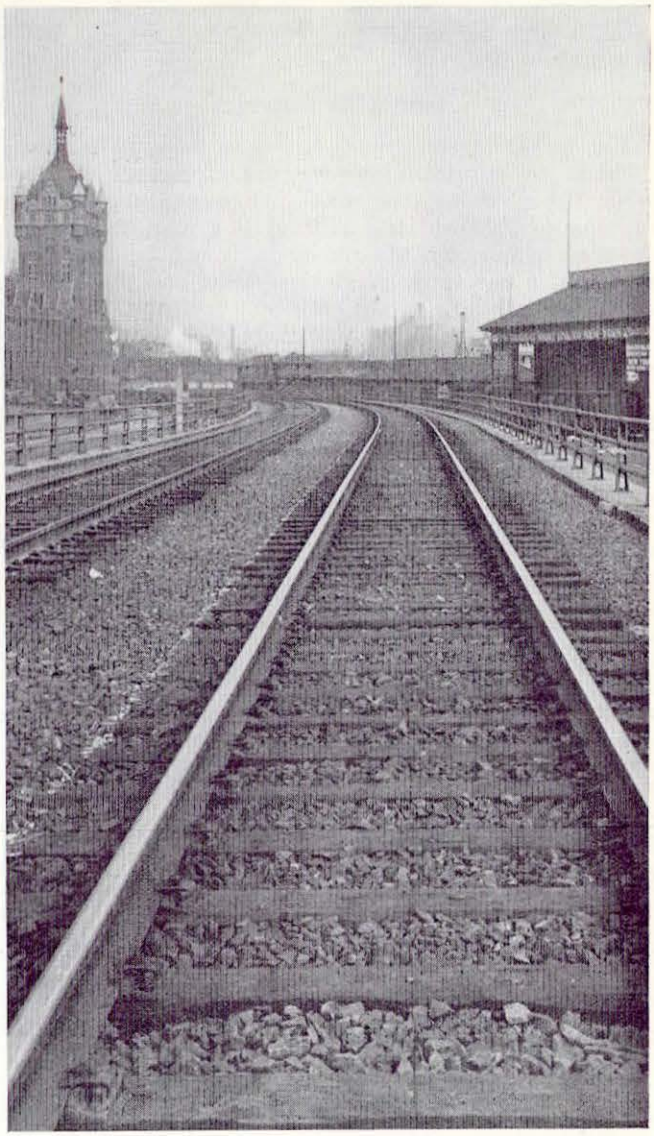
TRANSPORTATION officers are entitled to be furnished by the maintenance-of-way department with proper tracks and terminals, with all of their accessories and appurtenances. For the maintenance of way department to do this has become increasingly difficult, this year being the fifth successive year of declining maintenance activity or, if not declining, showing little improvement over the low record of 1933. In other words, for five years, retrenchment has been the order and working programs have been based, not on the needs of the properties, but upon the amount of money available.

That the properties have been able to stand up as well as they have in the face of such reductions in expenditures, and have come through in as good condition as they are today, is due to the reserve strength that was built into them in more prosperous years, and the fact that never before has maintenance work been accomplished more efficiently and economically. Reorganization of forces, closer supervision and effort to secure the maximum service from material and tools has been born of our necessity.

Retrenchment such as we have been witnessing cannot long continue, as deferred maintenance has been accumulating and, while not as rapidly as might be expected, it is a fact that so long as any deferred maintenance is accumulating, there must be a day of reckoning. With improved traffic conditions, maintenance expenditures will undoubtedly increase, but it will be a long time, if ever, before we will see them back on the basis of the expenditures between 1923 and 1929. In view of this, it behooves us to look to the improvement of our roadbed and track, so we shall have a track structure that can be maintained at minimum cost.

Railway maintenance men cannot rest in an established practice. Progress is incessant, demanding eternal alertness of all who would move with it. No business can escape change, time or season, nor can depression serve to halt the rushing flow of new developments.

For some years we have been constantly improving the drainage and stability of our roadbed. Where we install rock ballast, we consider the preliminary operations the major part of the work. Thus, before the stone is applied, proper ditches and drainage systems must be installed; cuts and embankments must be widened; and excessive curvature must be reduced and grades ironed out where economically possible.



A Section of the D. & H. Tracks at Albany, N. Y., Where the Rails Were Made Continuous in Lengths of from 500 to 2,800 ft., by Means of Thermit Welded Joints

For our track structure above the ballast, we on the Delaware & Hudson have been experimenting with various types of construction. A steel tie made from scrap rails has been developed that is satisfactory for yards, sidings and branch lines, and it is being used to advantage. For our main line, we have standardized on a creosoted red oak tie, pre-adzed and bored. From the single-shoulder tie plate, with anchor spikes holding it to the tie independently of the rail, we went to a heavy double-shoulder tie plate, with standard screw spikes holding it to the tie independent of the rail fastening, to eliminate mechanical wear of the tie.

With the standard A.R.E.A. screw spike, certain manufacturing tolerances are necessary. While these are minute to begin with, wear increases the size of the hole in the tie plate and decreases the size of the neck of the spike until finally it becomes necessary to regage the track. To overcome this, we have developed a tapered-head screw spike. The tendency of the tapered head of this spike is to compress the plate tightly into the tie, permitting no movement of the plate under traffic. At the same time, it provides plenty of take-up against wear. We have entirely eliminated the cut track spike

* Abstract of a paper presented before the New England Railway Club, at Boston, on November 13, 1934.

by the use of a spring clip fastening, which was developed after years of experimenting with various types of clips and wedges.

Long Rails Discussed

For years, intensive study has been made of the track joint in an effort to improve and strengthen it, and, while these efforts have met with some success, it is my opinion that, so long as there is a joint at all, with an opening between the rail ends, it will be expensive to maintain the track in good surface, and the loss of rail from battering of the ends will continue.

It has been considered that there is a limiting factor to the length of rails; namely, the necessity for allowing enough space between the rail ends to permit free expansion of the steel under the influence of temperature rises. A number of practical observations lead to the supposition that this factor is not so serious as it has seemed in the past.

In 1889, on the Lynchburg & Durham railway, a test was made in which 56-lb. rails were riveted together into a three-mile stretch, with no expansion allowance at the joints. The track was then covered with dirt, and expansion joints were installed only at the ends of the three-mile stretch. After the test had extended over 17 months, it was said that there had not been the slightest buckling of the rails, and that the track had not been surfaced or lined since it was first put in running condition. During the test period, the expense for labor in maintaining an adjoining three-mile section of ordinary track was $1,890. As a result of the test, however, it was found that the covering up of the ties caused their rapid decay and largely as a result of this, the experiment dropped out of sight.

The Germans have found that the expansion theoretically expected in their long rails does not actually take place. The Victorian railways in Australia, with rail lengths up to 225 ft., find that, with their standard track construction—spikes and ordinary joints—the actual expansion and contraction which occur are about one-half of the theoretical. It would seem, therefore, that forces sufficient to resist the tendency of the rails to expand must come into action; such as, for example, the lateral friction between the ties, rail and ballast.

That rail can be prevented from expanding when heated, cannot be disputed. Where the rail is so fixed that, when heated, it cannot expand into an extended position, and cannot move in any other way, as, for instance, by buckling, it is simply a case of the external forces on the rail being greater than the inherent compressive stress set up within the rail by the temperature rise. If the rail cools below the temperature at which it was fixed, an inherent tensile stress arises which is resisted by the influences which fix the rail.

While it is felt by European roads that the tendency of track with long rails to buckle under rises of temperature is overcome in well-ballasted and well-maintained track by the frictional resistance of the ties and ballast, the tendency to buckle can be entirely eliminated by either allowing the track to set in its extended position in an extremely hot period, or by welding the joints together in hot weather. Thereafter, the only inherent stress will be tensile stress, which will increase with the lowering of the temperature but not sufficient to affect the service strength of the rails. At periods when it is desired to work the track, in the spring, summer or fall, there will be only small tensile stress in the rail, and in hot weather, there will be no stress.

Experience with our standard construction shows that it resists the tendency for the rail to expand or contract to the extent that, when laid during cold periods, expansion allowance at the rail ends of only one-third the theoretical is found to be sufficient. European experience indicates that, with long rails, the normal tendency of individual short rails to expand and contract is greatly decreased. Therefore, with the greater holding power of our construction, it was our thought that rails could be welded into indefinitely long stretches without difficulty.

Rail exposed to a temperature change of 100 deg. from that at which it is laid, will be subject to a stress of about 19,000 lb. per sq. in. if it is held fixed in place. This amounts to 247,000 lb. in a rail of 13-sq.-in. section, which is well within the elastic limit of the steel, so that the rail will return to its original length when the temperature at which it was laid again prevails. Our experience with long stretches of rail indicates that we have little, if any, more expansion or contraction at the ends than would be expected with a 39-ft. rail in ordinary track construction.

Welded Rail Joints Considered

Many kinds of joint welds have been developed and used on electric railways. However, since the conditions on steam railroads are different, we must have, to my mind, a weld that duplicates the condition of the rest of the rail; in other words, a butt weld with all of the properties of the remainder of the rail, with no bars or plates to interfere with the wave motion of the rail or to change its stresses.

In Europe, three types of rail welds have been used: The electric arc weld, the thermit pressure weld, and the electric flash weld. The first of these welds has not proved successful, arc-welded joints having a relatively short life under the conditions imposed. It is probable, however, that with the present knowledge of electrodes and fluxes, an arc-welded joint could be produced, which, with proper heat treatment, would be satisfactory. Obviously, it would be very difficult to secure this proper heat treatment of a track joint.

Thermit welding, on the other hand, has been used successfully for a number of years in Europe, under all conditions. From a straight collar weld came the improved thermit pressure weld, using the thermit collar around the base and web, and a heat pressure weld on the head or ball of the rail.

The third method of welding, the electric flash weld, is a development of the simple butt welding process. In this, when the heated rail ends are forced together, any oxide that may be present is squeezed out of the joint and collects in beads, which can subsequently be removed, leaving a clean weld. Welding machines used in Europe for making the flash welds are semi-portable machines which can be erected at convenient depots, to which the rails are taken to be welded into lengths of 90 ft. or longer, the lengths being governed by the ability to transport them to the track. We believe it is entirely practicable to build portable equipment which will make electric flash rail end welds while the rails are in the track, in place on the ties.

In co-operation with the Metal & Thermit Corporation, an experimental stretch of rail was welded in the track on the Delaware & Hudson, during the hot weather of August, 1933. In this, rail lengths from 500 ft. to 2,800 ft. were built up, a total of 300 welds being made. At the end of the welded stretches, the rails were connected with regular track joints, except that in one instance an expansion joint was installed. No trouble was experienced with this track, the welded rails showing no greater tendency to expand or contract than the 39-ft. rails in our other track.

Five of the 300 joints welded failed. The first and

second failures were due to defective welds, while the third, fourth and fifth failures occurred during extreme cold periods. All of the failures occurred in the southbound track, none occurring in the northbound track which included the longest stretch of welded rails.

The three failures which occurred during cold weather have been identified as at joints which were left open for expansion during the progress of the work, and later welded up. This procedure resulted in poor welds with excessive strains, owing to the fact that the clamps used in making the welds were unable to move the long rail and provide sufficient pressure at the joints. In the northbound track, all rails were welded consecutively, and no failures have occurred. This track has been in service one year, with no trouble experienced from contraction or expansion. In May, 1934, 250 additional joints were welded at Mechanicville, N. Y., giving us four rails, each approximately 2,000 ft. long.

The General Electric Company has made for us a number of experimental electric flash welds in short lengths of 80-lb., 130-lb., and 131-lb. rails, and has tested these welds thoroughly in its laboratories. Typical laboratory tests of these welds indicate strength equal to that of unwelded rail.

There are many advantages in favor of indefinitely long rail lengths, lengths governed only by necessary breaks for signal circuits and switches. The more important of these are as follows:

(1) Savings in maintenance costs and in maintaining joints.
(2) Longer life of rail, due to the elimination of joint batter.
(3) Savings in labor in laying rails, due to increased life of rails.
(4) Better conductivity in track circuits.
(5) Elimination of the necessity for bonding joints.
(6) Savings in maintenance of rolling stock and motive power.
(7) Smoother riding track, with the elimination of the continual pound at joints.
(8) Saving in maintenance of alinement and surface by the elimination of creepage and its effects.

In fact, the advantages of welded track are so many and far reaching that one cannot afford to overlook them when, at this time, economies in maintenance are so necessary and, at the same time, improved track conditions are so essential.

There are some objections that will no doubt be raised to the use of indefinitely long rails. Some of these are as follows:

(1) Rail heats developing excessive transverse fissures, requiring the removal of the entire heats.
(2) The removal of broken and defective rails.
(3) The handling of relay rail released.

It is practical for the steel companies to ship at least 90 per cent of the rails of each heat together, so they can be laid in stretches. It then becomes a simple matter to take out an entire heat, if necessary, whether it is welded into one rail or not.

The question of the removal of a broken rail is another problem. There are a number of ways to handle this, depending upon the characteristics of the break or defect. In many cases, in welded track, there will be a saving in the amount of rail wasted where it is not necessary to remove the entire rail. Short pieces can be sawed out with small portable saws, replaced with new short pieces temporarily clamped in place, and the joints then welded later.

With rails welded into indefinitely long stretches, the loss of rail now occasioned by the battering of the ends will not occur and it will be possible to get the maximum wear out of rail, even in the main tracks. As a result, there will be less rail laid, and while it will be necessary to cut the relay rail into lengths for handling and to reweld it later in its new location, improvements in the art of welding are being developed which will at least make it possible to do this at no greater expense than the present method of handling rails, and, possibly, at a decreased cost.

Freight Car Condition As of July 1

WASHINGTON, D. C.

CO-ORDINATOR EASTMAN on December 21 sent to the Class I railroads a series of statements compiled by his Section of Car Pooling summarizing the replies of the railroads to a questionnaire regarding freight car condition as of July 1. This supplements a summarization as of July 1, 1933, furnished the railroads in November of last year, an incidental purpose of which he said, "was to direct attention to the condition of freight cars resulting from a long period of light demand, and to promote the early retirement of those units which, through age, obsolescence, or excessive

Number Freight Cars Owned

By Types and Truck Construction
July 1, 1934

		TRUCK			
		Cast Steel		Arch Bar and All Others	
	No. Owned 7/1/34	No.	%	No.	%
CLASS I RAILWAYS					
Box and Auto	860,197	598,314	69.6	261,883	30.4
Ventilated	39,077	24,317	62.2	14,760	37.8
Refrigerator	34,739	30,387	87.5	4,352	12.5
Stock	70,970	39,512	55.7	31,458	44.3
Gondola	413,432	304,144	73.6	109,288	26.4
Hopper	469,805	343,590	73.1	126,215	26.9
Flat	84,869	45,056	53.1	39,813	46.9
Tank	8,790	4,412	50.2	4,378	49.8
Special	5,534	3,670	66.3	1,864	33.7
Total	1,987,413	1,393,402	70.1	594,011	29.9
EASTERN DISTRICT					
Box and Auto	388,959	249,228	64.1	139,731	35.9
Ventilated	2,626	2,488	94.7	138	5.3
Refrigerator	4,108	1,677	40.8	2,431	59.2
Stock	11,603	6,466	55.7	5,137	44.3
Gondola	205,127	135,180	65.9	69,947	34.1
Hopper	374,735	276,734	73.8	98,001	26.2
Flat	19,860	9,633	48.5	10,227	51.5
Tank	27	5	18.5	22	81.4
Special	2,614	1,802	68.9	812	31.1
Total	1,009,659	683,213	67.7	326,446	32.3
SOUTHERN DISTRICT					
Box and Auto	87,560	71,121	81.2	16,439	18.8
Ventilated	35,980	21,829	60.7	14,151	39.3
Refrigerator	5,533	5,439	98.3	94	1.7
Stock	5,338	3,596	67.4	1,742	32.6
Gondola	66,789	61,621	92.3	5,168	7.7
Hopper	40,251	31,199	77.5	9,052	22.5
Flat	14,388	8,376	58.2	6,012	41.8
Tank	21	0	..	21	100.0
Special	1,208	625	51.8	583	48.2
Total	257,068	203,806	79.3	53,262	20.7
WESTERN DISTRICT					
Box and Auto	383,678	277,965	72.4	105,713	27.5
Ventilated	471	..	..	471	100.0
Refrigerator	25,098	23,271	92.7	1,827	7.3
Stock	54,029	29,450	54.5	24,579	45.7
Gondola	141,516	107,343	75.9	34,173	24.1
Hopper	54,819	35,657	65.0	19,162	35.0
Flat	50,621	27,047	53.4	23,574	46.6
Tank	8,742	4,407	50.4	4,335	49.6
Special	1,712	1,243	72.6	469	27.4
Total	720,686	506,383	70.3	214,303	29.7

Freight Cars Retired

Year Ending June 30, 1934
With Percentages Based on Cars Owned July 1, 1933

	Class I Railways Number	% 7-1-33	Eastern District Number	Southern District Number	Western District Number
Box and Auto	51,151	5.8	25,579	7,081	18,491
Vent. Box	2,903	7.0	45	2,852	6
Refriger.	1,639	4.7	327	155	1,157
Stock	3,459	4.7	668	134	2,657
Gondola	20,690	4.8	7,311	4,106	9,273
Hopper	12,626	2.6	10,247	967	1,412
Flat	4,960	5.7	739	1,201	3,020
Tank	146	1.6	4	0	142
Special	558	11.0	526	18	14
	98,132	4.8	45,446	16,514	36,172

(Note: For the year ended June 30, 1934, the Interstate Commerce Commission approved applications from fifty-nine railroads for authority to charge "Retirement" costs to the "Profit & Loss" account. The number of freight cars involved in these authorizations totaled 84,700, with retirement costs aggregating $33,556,452.31.)

Cars Scheduled for Retirement

From July 1, 1934 to December 31, 1935

	Class I Railways		Eastern District		Southern District		Western District	
	Last 6 Mo's 1934	Year 1935	Last 6 Mo's 1934	Year 1935	Last 6 Mo's 1934	Year 1935	Last 6 Mo's 1934	Year 1935
Box & Auto	32,585	41,762	16,779	20,064	2,416	3,847	13,390	17,851
Ventilated	2,289	2,568	16	15	2,273	2,553	0	0
Refrig.	1,882	2,357	584	439	83	481	1,215	1,437
Stock	3,058	3,986	952	1,007	469	422	1,637	2,557
Gondola	13,566	22,437	5,020	8,349	1,561	3,125	6,985	10,963
Hopper	11,054	15,330	8,263	12,936	1,633	907	1,158	1,487
Flat	3,446	7,021	795	1,901	588	777	2,063	4,343
Tank	41	413	14	0	0	10	27	403
Special	230	270	209	253	10	0	11	17
Total	68,151	96,144	32,632	44,964	9,033	12,122	26,486	39,058

Cars Scheduled For General Repairs

During 6 Months 1934 and Year 1935

	No. Owned Minus 1934-1935 Retirements	No. Scheduled for Gen. Repairs	Total Cost	Avg. Cost Per Car
CLASS I RAILWAYS				
Box	785,850	127,000	$38,102,294	$300
Ventilated	34,220	6,378	1,669,125	262
Refrigerator	30,500	2,814	2,137,876	760
Stock	63,926	12,873	3,055,882	237
Gondola	377,429	53,318	15,746,488	295
Hopper	443,421	75,673	22,985,503	304
Flat	74,402	8,180	1,338,967	164
Tank	8,336	1,642	436,697	266
Special	5,034	404	54,118	134
Total	1,823,118	288,282	$85,526,950	$297
EASTERN DISTRICT				
Box	352,116	49,418	$15,154,714	$307
Ventilated	2,595	240	96,100	400
Refrigerator	3,085	584	297,140	509
Stock	9,644	3,345	1,239,013	370
Gondola	191,758	22,765	7,333,134	322
Hopper	353,536	63,639	19,374,138	304
Flat	17,164	1,885	346,755	184
Tank	13	0	...	...
Special	2,152	31	3,928	127
Total	932,063	141,907	$43,844,922	$309
SOUTHERN DISTRICT				
Box	81,297	18,328	$4,560,797	$249
Ventilated	31,154	6,138	1,573,025	256
Refrigerator	4,969	913	1,066,465	1168
Stock	4,447	951	551,637	580
Gondola	62,103	8,014	3,161,213	394
Hopper	37,711	6,010	1,388,864	231
Flat	13,023	1,665	281,885	169
Tank	11	0	...	0
Special	1,198	369	49,650	135
Total	235,913	42,388	$12,633,536	$298
WESTERN DISTRICT				
Box	352,437	59,254	$18,386,783	$310
Ventilated	471	0	...	...
Refrigerator	22,146	1,317	774,271	588
Stock	49,835	8,577	1,265,232	148
Gondola	123,568	22,539	5,252,141	233
Hopper	52,174	6,024	2,222,501	369
Flat	44,215	4,630	710,327	153
Tank	8,312	1,642	436,697	266
Special	1,684	4	540	135
Total	655,142	103,987	$29,048,492	$279

Note: Attention is directed to the wide range of repair costs for the different classes of cars, as well as between the three Regions. Eliminating refrigerator cars, many of which are on a mileage rental basis, we find that cars for which the per diem rates allow an annual repair expense of approximately $150 per year, vary in the average cost of general repairs from $127 to $580 per car, according to class.

cost of maintenance, constitute a burden upon transportation."

For the year ended June 30, the report shows, Class I roads retired 98,132 freight cars, or 4.8 per cent of the ownership as of June 30, 1933, and on July 1 they owned 1,987,413 freight cars, of which 68,151 were scheduled for retirement in the last half of 1934 and 96,144 during 1935. Also 288,282 cars were scheduled for general repairs by the end of 1935 at an estimated cost of $85,526,950, an average of $297 per car, and 88,991 were to be given additions and betterments at a cost of $18,399,450.

The tables were included in a memorandum accompanied by comments by O. C. Castle, director of the Section, which, he said, had not undertaken to make a summary of such items as age, load limit, ledger value and depreciation, but had prepared statements covering retirements and repairs, some of which should be of general interest to railroad officers.

During the last half of 1934, 64,494 cars are scheduled for general repairs at an aggregate cost of $19,827,839, an average of $307 per car. For the year 1935, 223,788 cars are scheduled at an aggregate cost of $65,699,111, an average of $294 per car. For the eighteen months the total is 288,282 cars, the cost is $85,526,950, and the average $297 per unit.

Eliminating the cars to be retired through 1934 and 1935, the repair program is equivalent to giving heavy repairs to 15.8 per cent of all cars, and 16.2 per cent of the box cars left from the July 1, 1934, inventory. Details appear in accompanying tables.

Cars To Be Given Additions and Betterments

During 6 Months 1934 and Year 1935

	No. Scheduled for Addn's and Bmts.	Total Cost
CLASS I RAILWAYS		
Box and Auto	46,771	$12,090,268
Ventilated	2,001	92,970
Refrigerator	616	93,308
Stock	4,787	1,089,607
Gondola	12,378	1,821,195
Hopper	16,496	2,409,667
Flat	4,617	542,486
Tank	1,325	259,949
Special	0	...
Total	88,991	$18,399,450
EASTERN DISTRICT		
Box and Auto	19,180	$8,093,828
Ventilated	210	11,550
Refrigerator	299	7,475
Stock	50	4,500
Gondola	6,220	1,084,348
Hopper	14,772	2,158,791
Flat	210	20,696
Tank	0	...
Special	0	...
Total	40,941	$11,381,188
SOUTHERN DISTRICT		
Box and Auto	3,275	$127,845
Ventilated	1,791	81,420
Refrigerator	286	85,800
Stock	0	...
Gondola	729	54,479
Hopper	112	4,049
Flat	353	35,969
Tank	0	...
Special	0	...
Total	6,546	$389,562
WESTERN DISTRICT		
Box and Auto	24,316	$3,868,595
Ventilated	0	...
Refrigerator	31	33
Stock	4,737	1,085,107
Gondola	5,429	682,368
Hopper	1,612	246,827
Flat	4,054	485,821
Tank	1,325	259,949
Special	0	...
Total	41,504	$6,628,700

How Avoid Government Ownership?*

Intelligent co-operation of public authorities, investors, railway managements and labor can vastly improve conditions

By F. J. Lisman

IDEAL transportation is direct expedition from the point of origin to destination at a minimum expense. In primitive times persons, goods and even letters were carried practically that way by horseback, human back or otherwise. A fair example of ideal transportation is the handling of letters in large office buildings and apartment houses where quantities originate—mailing facilities within a step and delivery, in effect, direct to the recipients' doors. As the volume of mail dispatched diminishes, the facilities are lessened proportionately.

In the cities, one living in a small building may have to walk as much as 100 yards to a letter box. In the country districts, it may be several miles to the nearest post office. The sender or recipient of letters or parcel post is accustomed to this; he takes it as a matter of course that the service corresponds to the volume and is prepared to pay extra for special or expedited service. The same principle should apply to the dispatching of passengers and freight.

Adjust Service to Customers, or Vice Versa?

When transportation by rail was introduced, it was something so entirely novel that for a time people adjusted themselves to the railroad rather than the opposite. With the development of the automobile, door-to-door service became feasible when not too expensive and people naturally turned to it. Railroad management, having for several generations thought of transportation strictly along professional lines, has been slow to note this evolution, which has now gone so far that it means a complete revolution, or change in methods.

Enormous sums have been invested in transportation facilities; 25 billions, according to official figures, in railroads during approximately 100 years—more than one-half of this since 1900. Somewhere between 30 and 45 billions have been invested, within the last 30 years, in highways, automobiles and appurtenant industries such as garages, repair and oil stations, etc., and more money is still being spent for these purposes, while the railroad plant has been contracting somewhat.

Disregarding pleasure traffic on the highways, the transportation plant is entirely too large; it must be contracted and co-ordinated and operated at the maximum of efficiency for service in order to get the best results for the public which has invested in railroad securities—as well as in state, county and district bonds issued for highway purposes; also for the user of the facilities. Steps for this co-ordination should be brought about as quickly as possible.

When railroads were first built and before there was any regulation of rates and services, the public hoped to obtain such regulation automatically by competition, which was stimulated and propagandized in every way possible. Like most activities thus forced, this was overdone. There were too many railroads and wasteful competition resulted; regulation became necessary and then regulation became over-done. Now an attempt is actually being made to regulate the profit of farmers, producers of lumber, etc., by adjusting the rates for carrying their products, irrespective of the cost of doing so.

A New Transport Plan Urgently Needed

A comprehensive plan, fair as nearly as possible to all parties concerned, is now urgently required.

Probably the best method of approaching the problem from all angles, is to try to imagine what we should need in the way of transportation if we could start with a clean slate. We should require the railways where traffic is heaviest, with truck and bus service over hard roads where traffic is lighter. We should have to be satisfied with inferior roads where no hard road is justified. This would create a system which, with transfers here and there, the same as now, would take and deliver the passengers practically from door to door and freight from point of origin—whether at mine, field or factory—to destination, be it warehouse, store, kitchen or any other place.

For some months the Rock Island has been operating nightly a service between Chicago and Moline, and Chicago and Peoria, which handles two truck bodies to the flat car at a rate which shows a profit to the railroad and a saving to the truck company. All such services may be performed by one organization, although if private enterprises can handle their own goods more economically, they should be permitted to do so. For example, the farmer may be able to use the horses and mules which he needs for plowing, for the purpose of hauling fertilizer to his field; or, a brick kiln may be so close to the site of a building being erected, that intervention of the activities of a large organization may be uneconomical.

Undoubtedly there are great possibilities in the shipment of all kinds of goods by refrigerated and other containers. In many small communities which lack the power to consume a carload of some perishable food articles, such as fish, citrus fruits, berries, etc., these articles are now used to a very limited extent because they are not on sale in satisfactory condition. The market for these commodities would be greatly enlarged if the products were delivered in small quantities and in satisfactory condition. Such service would require consolidation by merger, lease, contract or otherwise, of the various types of transport.

The writer is of the opinion that with close regulation, competition is not necessary; nevertheless, the point of view of the public at large and, therefore, of its representatives who frame the laws and regulations, will be that some competition will still be needed. This would mean that instead of possibly 151 class I railroads and over 700 short line railroads, together with thousands of separate truck and bus operations, attempts should be made to encourage mergers into a limited number of all-round transportation systems.

In order to bring this about and to earn a fair return on

* This article is presented as an interesting and thought-provoking discussion by a disinterested student of transportation. Its publication does not imply that the *Railway Age* agrees with all the observations and conclusions of the author—EDITOR.

the money invested in a co-ordinated transportation system, much needs to be done. The distribution of securities of the systems to be formed should be based on the physical value of their property presently required for public service, taking into consideration their earning capacity under reasonable regulation. The word "reasonable," we have learned, is something which in many cases has to be defined by the Supreme Court; that is, whenever the parties in interest have enough money to carry litigation to that court of final jurisdiction. Therefore, this contemplated consolidation probably could not take place on a large scale until the Supreme Court had passed on a number of its phases.

Superfluous Railway Plant

Looking at the railway system of the country from the point of view of what would be presently required in order to give the public adequate service, we come to the inevitable conclusion that of the 250,000 miles of line now in the United States, 25 per cent or 60,000 miles more or less, would appear to be entirely superfluous. These 250,000 miles at the value of 25 billion dollars for the whole, have an average physical value of about $100,000 per mile of line. This includes mileage which may carry as little as 10,000 tons per year per mile of line and other lines carrying as much as 25 million tons.

Ten thousand tons of freight per year means only about 27 tons per day which is from 4 to 10 truck loads, dependent on their size. This amount of traffic obviously does not warrant the maintenance of expensive train service, the payment of taxes and upkeep of track. The average annual traffic density per mile of railroad is at present about 1,200,000 tons, producing at the prevailing freight rate of a shade over one cent per ton per mile, a little over $12,000 per mile of line. It may be taken as an axiom that no railroad handling business at one cent per ton per mile can do more than pay out-of-pocket expenses on traffic of less than 1,000 tons per day.

The scrapping of one-quarter of the mileage in no way means the annihilation of one-quarter of the capital investment in railroads. It would probably mean not more than 8 per cent, or say 65,000 miles, of an average physical value of around $30,000 per mile, or about 2 billions in all. The entire amount of railway securities, representing about 25 billions, is selling today for much less than one-half of that sum. Therefore, the cutting off of some 2 billion dollars is more than discounted in present market prices. As a matter of fact, if the assumption is correct that these 65,000 miles show a deficit of probably over 100 million dollars per year, then the net earnings of the remaining mileage would be increased by that amount which, capitalized at the assumed fair return of 5¾ per cent, should actually increase the market value of the existing securities by about 1¾ billions.

The loss from scrapping that much property would, of course, have to be adjusted in the balance sheets of the various companies, but in the long run these balance sheets cannot in fact reflect any more than the fair value of the properties devoted to public service, irrespective of what so-called book value may show. Earnings, which alone can pay interest and dividends, must not be sacrificed to the balance sheet.

Increased Net Income

The increased net income from the remaining 185,000 miles would have to come, the same as now, out of surplus of income above operating expenses, taxes, etc. Fully 80 per cent of operating expenses consist directly and indirectly of wages in the various departments. Labor naturally seriously objects to elimination of employment and, being organized, is in a much better position to defend itself than the investor can against the elimination of his capital.

While the United States was a new country with an ever-expanding frontier there was no surplus of labor. In fact, immigration was encouraged. The so-called frontier has now ceased to exist and we are tending toward a more settled status with reduced opportunities. Therefore, labor wants security of employment and appears entitled to some discharge compensation unless other opportunities for earning a living are accorded. The curious thing about transportation, however, is that with the apparent great reduction in the number of employees in the railroad branch of the business, the number engaged in the industry has been greatly increased, owing to the number of men employed in connection with over one million commercial vehicles now using the highways, together with supplementary requirements, such as garages, repair shops, etc., etc.

Driving on the highways is more strenuous and requires, if anything, more work and discipline than driving on rails. Comparatively few former railroad men are employed in highway transportation, probably due to the very much lower pay in that field. Obviously, either the employees of carriers moving on rails and therefore with greater safety are overpaid or those engaged on the highways are underpaid.

It is now quite properly suggested, even by governmental authorities, that this difference be leveled. At present, in many cases, enginemen and conductors receive for a much lesser number of hours as much as five times the daily pay of many truck drivers. While it may not be reasonable to expect railroad labor to admit that their pay is greatly in excess of the rate of pay in similar occupations, the fact is that earnings will no longer support both the high wage rates and restrictive rules, sometimes called "featherbed rules," which the unions with the aid of legislators have gradually compelled the carriers to concede.

Railroad wages during the last 20 years advanced much more than freight rates and have handicapped the railroads in their competition with other methods of transportation. The wage question is a tremendously difficult one, largely because it is subject to political pressure.

Recently there has been a great change for the better in the intelligence of leadership of the railroad unions which appears to prove that the railroad employees are themselves visualizing existing conditions. They probably also realize that unless they co-operate in this matter, government ownership will become unavoidable and that then there will be no enforcing of their demands. Instead politics will creep into management, which means a great many employees at low wages and promotion by "influence" instead of merit. Railroad employees probably average as to their intelligence, dependability, etc., higher than members of any other labor group. This is because they have mostly worked from the bottom up and have had thorough training and learned to carry a fairly heavy responsibility at all times. The same kind of training, and sense of responsibility are needed, if anything, more for operation on highways and, owing to the increasing number of accidents, it is bound gradually to be made compulsory. Any railroad employee threatened with loss of position by abandonment of a railroad line, certainly should have the first opportunity of employment on a substitute truck or bus line, the same as former drivers of horses had first call on chauffeur positions.

There are many other ways in which all the carriers can reduce expenses, although obviously in most cases

this would mean a reduced number of employees. A lesser number of men after consolidation, irrespective of abandonments of all kinds, will be required in the general offices, soliciting departments and even in the shops. On the other hand, better facilities will undoubtedly increase business which, regardless of general conditions, should tend toward creating additional employment.

Greatly reduced passenger rates in the west and south have increased passenger traffic to a great extent in the number of passengers carried and to some extent have produced increased revenue but hardly sufficient to require the operation of additional trains.

Much fault is found with the lines in the eastern territory where passenger traffic density is heaviest, for not reducing passenger rates which seem quite high. There is this to be said, however: if we should be so unfortunate as to have inflation, the carriers will not be permitted at the beginning to advance their rates and at best the rates charged for anything by any public utility company will advance much more slowly than increased costs.

Railroad officers very frequently would like to experiment by reducing rates in many directions, but fail to do so for fear they will not be able to advance them if they find that reduced rates will not produce the expected increase in volume together with some increased net profit.

Other Savings

The various suggestions made by the Co-ordinator to the carriers for co-ordination in simplifying accounting, combining the use of terminals, the pooling of cars, the use of the most accessible elevators, closing unproductive soliciting or ticket offices, extra service charges for stopping freight in transit, adequate enforcement of demurrage rules, adequate rentals for warehouse and pier facilities owned by railroads, etc., have thus far not met with a cheerful reception by the parties concerned. While many of these matters bristle with difficulties and legal problems, a careful reading of the arguments pro and con rather indicates some spirit of antagonism by railway officers to all these suggestions.

Undoubtedly, in each case, the recommendation of the Co-ordinator's organization is submitted by the heads of the various railroad companies to the several departments concerned, that is, traffic, operation; maintenance may also be concerned. These department heads may often believe that their chief wants them to criticize and, that being the easiest thing to do, they naturally do it cheerfully and sometimes quite forcefully, although the reasoning may be based on the customary human inertia; that is, the desire to continue to do things the old way, rather than to go through the painful process of changing one's mental attitude and doing things differently.

Just how much economy can be effectuated in the operation of railroads is problematical; it certainly should be two hundred millions. L. F. Loree, who is generally considered one of the most experienced men in the railroad profession, some years ago estimated it at several times that. The elimination of wasteful long hauls by trucks where railway service is more economical and the converse of wasteful short hauls by railroad, would also save many millions.

Lack of Progressiveness

The carriers are blamed for not having experimented sufficiently and for having waited on each other to develop improvements. It is just possible that the carriers might not have lost as much of their local passenger business if satisfactory rail-motor cars had been developed ten years ago. A rail car or, for that matter, a car which will run both on rails and on highways, propelled by steam power, is and has been greatly needed and surely could be developed.

Railroad officers are inclined to dread friction with labor and dodge it to the utmost. It was known that labor unions were insisting on a crew of four men to a motor car, which would make the installation of such cars not worth while. This was certainly a contributary, if not the dominant, reason for the lack of development in that particular field. It also proves that labor, like others, when in power can and does overreach, because in consequence of this exorbitant demand, many passenger trains have been discontinued and the number of men required for operation of service has been reduced by a much greater number than would have been the case if the rail-motor car had been promptly developed. Many people are of the opinion that an economically operated rail motor car will create much additional business which might mean the actual employment of more men in passenger service than at any time previously.

Locomotive designs have been improved practically with each year. Much money has been spent for locomotives with increased tractive power in order to increase train loads and in order to reduce the number of trains and therefore of employees. This progress in motive power was greatly stimulated by the high wage level. The increased capital charge in connection with this development has been substantially less than the wages of the greater number of employees which would otherwise have been required in the hauling of additional trains. The employees, on the other hand, claim that they should be paid more because the companies have reduced their operating costs by such capital investments.

There has been much criticism of the lack of development of a more uniform or lighter and/or more flexible freight car. This problem is inter-related with the tensile strength of metals, in which direction much progress has been made of late. The criticism of not standardizing these cars which are being constantly interchanged, is possibly partially justified.

There has been great waste in the construction of huge passenger stations, only too frequently prompted by local real estate interests—as for instance is the case now in Los Angeles. These architectural monuments, which not only require large sums for interest and taxes but also increased operating expenses per car hauled, are a great sorrow which may only be ameliorated by a greatly increased volume of long haul passenger traffic.

A railroad system constructed at this time to serve the entire country, would require the construction of most of the main lines east of the Alleghenies with the elimination of parallel lines here and there. West of the Alleghenies and east of the Rockies, the country would be adequately served by lines about 40 miles apart. Further west, existing duplication through mountain passes and paralleling would be avoided. Similar conditions apply to the level sections in the southeast, except that obstructions caused by large rivers would be factors to be considered.

Intelligent Co-operation of All Parties Necessary

In order to effectuate all these adjustments and co-ordinations which should mean better service at reduced cost plus a fair return on the capital invested in the necessary facilities, the intelligent co-operation of all parties in interest is essential. These parties are:

1. The Public authorities
2. Railway officers
3. Representatives of labor
4. Representatives of investors

All these groups are influenced by self-interest and

habits of thinking. The public authorities are supposed to hold the scales of justice in balance but they certainly have failed to do so heretofore and it seems very doubtful whether they will do any better hereafter. Their power and stubbornness can only be overcome by an aroused and intelligent public opinion. This is a very large order!

While the United States is sub-divided into presumably self-governing states, transportation has been decided to be predominately interstate and, therefore, subject to federal regulation. Nevertheless the state authorities who insist on pandering to narrow local interests fight and delay almost every attempt at abandonment to the utmost limit. Practically every locality thinks it is entitled to some advantage over others and any section producing a small amount of traffic believes itself entitled to the same rate level and the same type of service as other sections producing several times as much.

State authorities consider that a moribund property owned locally is entitled to greater protection than ten times that investment owned by a public utility. It is possible that a few sweeping Supreme Court decisions may change this.

The Viewpoint of Managements and Labor

Many railway officers have grown up under conditions when the railroads had the transportation monopoly. The separate lines were engaged in what now looks like reckless competition and even in the past, to impartial observers, seemed unreasonable. While in most cases their companies have ceased to pay dividends or even interest on their bonds, some officers still are inclined to think of the prestige of "their" railroad, something in which the investor is usually not interested, because he wants dividends, and quite possibly he might also have an equal interest in two or more competing companies.

While such officers have been harassed by a multiplicity of federal, state and local regulations, some have failed to familiarize the public with their problem because, instead of meeting the situation locally with the people eye to eye, they have too frequently tried to educate the public by impersonal propaganda which sometimes has been little more than whining. Some managements have also been too self-satisfied because their own security holders have been inarticulate. The bankers who have distributed the securities have been unwilling to assert themselves in the management because they did not want it said that Wall Street or the bankers were running the railroads. As a matter of fact, if they had asserted themselves intelligently and objectively, the results might have been different. It should be remembered, though, that bankers are human and therefore disinclined to antagonize men who might take their banking business elsewhere.

The representatives of labor should also realize that they cannot exact more than the traffic will bear. Railroad employees, with the possible exception of those in train and engine service, were grossly underpaid twenty years ago even in comparison with other walks of life. This is exemplified by the fact in 1913, 1,759,020 employees of railroads earned $1,338,612,385; in 1933 the much smaller number of 971,196 earned $1,403,840,833. Now the pendulum has swung far in the opposite direction.

Railroad labor is much more closely organized than any of the other groups concerned because they have no conflicting or competing interest. Many labor leaders are mere politicians who look no further than the next election of their union and talk and act accordingly. However, some are men of broad understanding and real vision; it is to be hoped and is quite possible that out of these there may come some real constructive leadership of the type of the late P. M. Arthur, who, during his time, a generation ago, made the Brotherhood of Locomotive Engineers probably the most highly respected labor union in the world.

The Inarticulate Investors

The investors may be divided into two classes—bondholders and stockholders. A majority of bonds are held by large insurance companies, banks, educational and beneficial institutions, etc. Each group is busy with its own affairs and generally co-operates, if at all, only in case of trouble. They have been and still are largely inarticulate. Although we think of these holders as institutions, the final parties in interest are the public; that is, the holders of 67,000,000 life and of fire and other insurance policies; depositors in savings banks, those interested in having their children educated in endowed schools or colleges or those who hope, if necessary, to have the benefit of hospitals and other institutions of that type.

Stockholdings are more scattered. The bulk of the personal interest of stockholders is concentrated in other directions and they are entirely unorganized. In fact, probably one of the greatest problems of our day arises from the existence of large corporations whose stock, in many cases, is not even to the extent of one per cent owned by any single individual. Such corporations have in effect self-perpetuating management and their activities and success are entirely dependent on the sense of responsibility of the directors. The position of directors of late has been made more difficult than ever by additional responsibilities laid upon them without adequate compensation, and by the constant threat of law suits.

The shippers or the public are not mentioned among these four groups because the public authorities are supposed to represent them. The transportation problem in the final analysis is an intensely human one. The responsibility for its difficulties is due to the imperfections of human nature inherent to all parties concerned.

Summing Up

The problem is an urgent one because the values of railroad securities which are held by fiduciary institutions, as mentioned above, which really means the people, are shriveling and also because nothing would give greater stimulation to general business than the re-entry of the railroad companies into the materials market. Another important factor leading to recovery would be restored confidence on part of investors. If they could be made to feel that their savings invested in railroad securities would not disappear, they would purchase more freely of all kinds of commodities which would affect every trade; for example, people would buy automobiles and jewelry; many would improve their homes or possibly add to them.

The reflation of greatly deflated railroad securities would incidentally mean the advance in the price level of most securities which would help to restore confidence at large much more than hopeful announcements from Washington.

It is impossible to deny that most people look upon the broad movements of the stock market as a barometer reflecting future conditions. Theoretically, a plan for a modernized, efficient national transportation system should be worked out by representatives of the groups concerned. It does not seem possible, however, for these groups, except labor, to become articulate, because they are entirely unorganized.

Nobody at all can represent the investors as a group.

(*Continued on page 869*)

Junction Controlled Remotely on Lehigh Valley

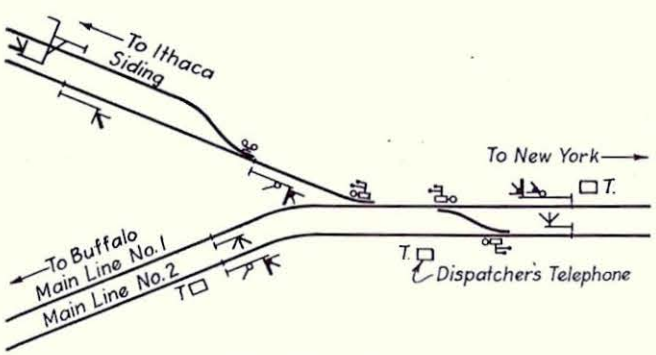
New power switches and signals controlled by C. T. C. type of equipment replace mechanical interlocking

AT Van Etten Junction, N. Y., the Lehigh Valley has replaced a mechanical interlocking with power switch machines and signals which are controlled remotely, by centralized traffic control circuits and equipment, from a C. T. C. machine located in State Line Tower, 13.2 miles east. The use of a new type of quick-detachable C. T. C. relays, facilitating maintenance inspection, is a feature of this installation.

At Van Etten Junction a single-track line diverges from the double-track main line and extends by way of Ithaca to another junction with the main line at Geneva Junction, the distance between the two junctions being 56.3 miles by way of the main line, while through Ithaca the distance is 59.5 miles. To serve Ithaca, certain important passenger trains, including the Black Diamond, are routed over the single-track line, while through freight trains and several night passenger trains are routed over the low-grade double-track line. The daily traffic consists of five passenger trains each way via Ithaca, and three passenger trains each way via the main line, as well as 20 to 22 freight trains and a varying number of extra passenger trains. Thus the total daily traffic through Van Etten Junction averages more than 36 trains daily.

Track Layout and Signaling

At Van Etten Junction, where the new remotely-controlled equipment replaces the mechanical interlocking, the three new electric switch machines, for the crossover and junction switch, are equipped for dual control, and the signals are of the position-light type. The westward home signal has a three-position top "arm," for directing movements on the main line, and a two-position bottom "arm," which directs movements to the Ithaca line, its pivot light serving as a marker for the "Stop and Proceed" indication. The eastward home signal on the Ithaca line likewise has two "arms," while the eastward home signal on the main line has one three-position "arm" and a marker. These high signals are so controlled that a "Stop and Proceed" indication is displayed when the control lever is cleared with the block occupied by a preceding train; this indication changes to a more favorable indication when conditions permit. The two dwarf signals operate to three positions, including the 45 deg. in the lower quadrant as the third position. The double-track main line, as well as the single-track line via Ithaca, are equipped with semaphore upper-quadrant type automatic block signals, and certain of these automatic signals serve also as approach signals for the new remotely-controlled interlocking at Van Etten Junction.



Track Plan of Van Etten Junction

The Control Is of the C.T.C. Type

The Control Machine

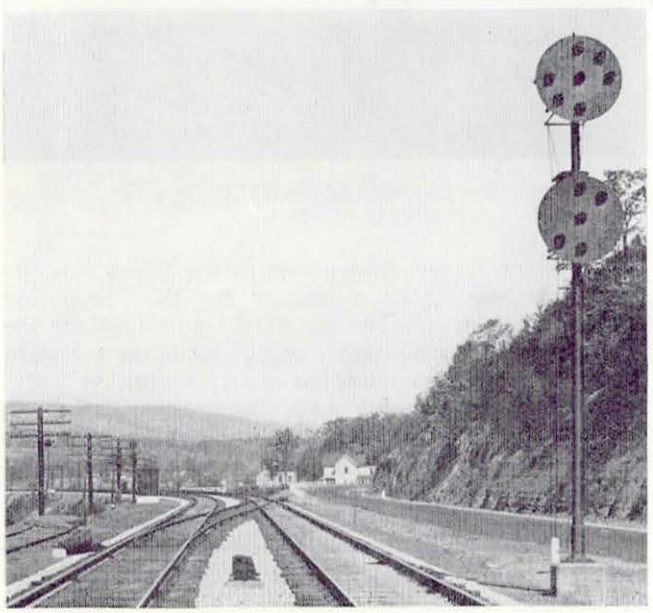
The control machine in the State Line Tower is the latest C.T.C. type, having five rotary-type levers, two for signals, two for switches and one spare. Only two levers, one for each track, are required for the control of the five signals, because the proper signal clears for the route set up by the position of the switches. One switch lever controls the two crossover switches and the other lever controls the junction switch. A lens and a lamp are mounted in the face of each switch lever, which light when the position of the switch does not correspond with that of the lever. An illuminated track diagram above the levers forms a part of the machine. On the lines representing the tracks, a lamp in each of the distant, home and "OS" sections, is lighted when the corresponding section of track is occupied by a train. The position of each switch is indicated on the diagram by

miniature movable points which repeat the operation in the field. Likewise, when a signal displays a proceed aspect, this fact is indicated by the illumination of a lamp on the diagram adjacent to the symbol for the corresponding signal.

The control circuits are of the two-wire C.T.C. duplex type, only two No. 10 insulated copper line wires being required between Van Etten Junction and State Line tower. The duplex arrangement involves polarized control, i.e., a series of positive and negative impulses, for the control of functions, and timed indications, i.e., a series of short and long impulses, for sending in indications to the control machine. The coding apparatus is built up of the latest Type-A individual quick-detachable C.T.C. relays, which are assembled in sheet-metal cabinets. These relays are equipped with plug-type connections so that any relay can easily be pulled out and replaced without removing any wire connections, because all wire connections are made on the stationary plug boards.

A-C Floating Power System

The a-c. floating system of power supply, using storage batteries charged through rectifiers, is used for the operation of the switches, signals, track circuits and various control circuits. The signals are fed by a-c. normally but in case of an a-c. outage the feed is cut over on to the storage battery. The a-c. power is generated in the railroad shop at Sayre, Pa., about one mile east of State Line Tower, and is transmitted to Van Etten Junction at 440 volts over an open line of two No. 4 copper line wires. At each signal location, a General Electric capacitor is provided to correct the power factor. Previous to the installation of the capacitors, the feed was increased to 465 volts at the power house and again stepped up at State Line Tower, but even then, normal voltage was not maintained at Van Etten Junction.



Position-Light Signals Are Used

At Van Etten Junction, all the relays, code equipment and battery are located in a welded sheet-metal house 6 ft. by 12 ft., set on a concrete foundation. This house is divided into two compartments, the outer one of which is used as a telephone booth and is locked with a standard switch lock so as to be accessible to trainmen, while the inner door is locked with a signal department lock, so as to be accessible to signal department forces only.

This installation was designed and installed by signal and telegraph department forces of the Lehigh Valley. The signal equipment, including switch machines, signals, C.T.C. control system, relays, rectifiers, etc., was furnished by the General Railway Signal Company.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended December 15 totaled 579,935 cars, an increase of 28,924 cars as compared with the week before and of 20,516 cars as compared with the corresponding week of last year, largely attributable to heavier coal loading. As compared with 1932 this was an increase of 64,166 cars. Loading of miscellaneous freight, coal, and forest products showed increases as compared with last year, while coal, grain and grain products, forest products, and coke showed increases as compared with the week before. The summary, as compiled by the Association of American Railroads, follows:

Revenue Freight Car Loadings

Week Ended Saturday, December 15, 1934

Districts	1934	1933	1932
Eastern	134,609	126,389	121,245
Allegheny	110,169	106,434	96,647
Pocahontas	40,615	38,315	40,301
Southern	88,068	84,021	79,594
Northwestern	68,315	65,077	59,537
Central Western	87,559	90,315	75,500
Southwestern	50,600	48,868	42,945
Total Western Districts	206,474	204,260	177,982
Total All Roads	579,935	559,419	515,769
Commodities			
Grain and Grain Products	30,233	29,956	25,491
Live Stock	18,564	17,493	17,194
Coal	147,907	127,448	144,803
Coke	7,655	7,694	6,678
Forest Products	20,725	20,367	11,861
Ore	3,089	3,431	2,053
Merchandise L.C.L.	154,949	159,713	159,727
Miscellaneous	196,813	193,317	147,962
December 15	579,935	559,419	515,769
December 8	551,011	541,992	520,607
December 1	488,118	499,596	547,095
November 24	561,313	585,738	493,318
November 17	584,525	602,708	572,623
Cumulative Total, 50 Weeks	29,812,579	28,233,823	27,280,141

The freight car surplus for the last half of November averaged 381,355 cars, an increase of 32,035 cars as compared with the first half of the month. The total included 224,104 box cars, 109,221 coal cars, 24,640 stock cars, and 9,045 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended December 15 totaled 43,367 as compared with 38,888 in 1933 and 43,418 cars for the previous week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
December 15, 1934	43,367	21,644
December 8, 1934	43,418	19,096
December 1, 1934	45,515	17,575
December 16, 1933	38,888	18,509
Cumulative Totals for Canada:		
December 15, 1934	2,249,488	1,063,048
December 16, 1933	1,966,987	922,042
December 17, 1932	2,118,791	941,351

New Waterway Policy Recommended

Mississippi Valley Committee finds large sums being expended on doubtful or unjustified projects

WASHINGTON D. C.

RIVER improvements designed to afford cheap water transportation are costing the taxpayers in many instances far more than they are saving the shippers, but where they are reducing transportation expense to the shippers they ought to contribute to the cost, according to a report by the Mississippi Valley Committee to the Administrator of Public Works as to ways of co-ordinating the use and development of the water resources of the valley. Statements are included showing that the cost to the government of the maintenance of many of the improved waterways, including interest on the construction cost in some instances, greatly exceeds the cost of hauling freight, ranging from $.001 per ton-mile on the Monongahela river to $3.50 on the Osage river, whereas the average rail rate is less than a cent a ton-mile.

The committee finds lack of economic justification for much of the large expenditure of the federal government on waterway improvements, particularly those on the Upper Mississippi and Missouri river systems, and suggests an inquiry as to whether or not shippers should bear a portion of the cost. As to some proposed projects it recommends that further improvements be held in abeyance until more careful studies have been made and pending a reconsideration of policies whereby the cost to the government would be repaid by shippers who receive the benefits.

However, the committee also sees need for "poise and deliberation" and finds that navigation of lakes and rivers has an important place in a nation's transportation system, saying "it is a form of transportation which expresses deep-seated racial and national instincts and in it there are already huge public investments." If we had never gone in for inland waterways, it remarks, our problem would be different. "But we are in it and in deep, and probably to stay, if only for the reason that development or regulation of a given river may be desirable from one or more standpoints other than navigation." It recommends that the main stem of the Mississippi and other great arteries of water transport, including connections with the Great Lakes, should be adequately developed but that navigation on tributaries should be extended only where intensive studies indicate economic justification. Projects relating to local waterways, it says, should be evaluated strictly on their merits, and be promoted only as they can play an important part in a co-ordinated system.

New Commission Suggested

The report also recommends the establishment of a suitable waterways commission to study and regulate inland waterway development and navigation, with the expectation that ultimately all forms of transportation— rail, water, highway and pipe line— may be unified as parts of a co-ordinated system and brought under one regulatory body.

The committee finds that during the next 20 years the federal government could profitably spend a billion dollars on river works, including flood control and other projects, in the Mississippi Valley, 50 per cent of which would be self-liquidating, but that such a long-range flexible program would require continuous preparation for next steps; economic and engineering studies to determine the order of projects on the basis of local need and general benefits; and detailed surveys and the preparation of basic plans in order to have them in hand for prompt action in accordance with public policy at any particular time. It is suggested that such a program include $400,000,000 for power, $300,000,000 for flood control and $300,000,000 for navigation.

Regarding the Upper Mississippi system the report says: "It is not possible by any calculation of business accounting to discover any economic justification for the vast expenditures on the projected improvements of these waterways. . . Navigation projects on the Upper Mississippi system have cost the federal government to June, 1934, a total of more than $126,000,000 for construction alone, to which the completion of existing projects will add another $91,000,000. At the present no strictly economic justification can be found for this expenditure. It is possible that the future will tell a different story." For the latter reason the committee does not recommend discontinuance of the present project for a nine-foot channel in the Upper Mississippi.

As to the Missouri it says: "The main stem of the Missouri river is being improved for navigation in the face of great obstacles and at an expense which has very doubtful justification. . . Although large sums have been spent in improving channels along the Missouri system the commercial usefulness of the river has not been great as yet. Until the value of further improvements, costing about $250,000,000, is determined, no further projects are recommended. It is recommended that the Osage river project be abandoned."

As to the Lower Mississippi the report says the total government subsidy provided shippers by water is about 6 mills per ton-mile, river mileage, or about 9 mills when reduced to a basis comparable to expenditures for rail haulage, and that "a detailed study should be made of the costs of, and the savings, if any, accruing from the improvement of the lower Mississippi for purposes of navigation, with a view to determining whether or not the savings to the shippers warrant the payment by them of any charge for the use of the waterway. Such a study might well involve a consideration as to whether or not there are good reasons for the continued existence of the Inland Waterways Corporation, in view of the spirit of the act of 1924 by which it was established."

The committee also finds that "navigation on the tributary streams, despite costly channel improvements, is of slight importance and that navigation on the Mississippi itself has been declining since 1926." In view of the fact that the federal government has spent or authorized the spending of about $190,000,000 for improving the channel between New Orleans and Cairo, it says an inquiry as to whether or not shippers should bear a portion of the cost is highly desirable.

Regarding the Ohio system the report says its extensive use is indicated by the fact that the Monongahela alone leads all the inland rivers of the United States in traffic, and that the Ohio itself carries more than the Mississippi. "With costs to the federal government for

improving and maintaining channels ranging from one mill for each ton-mile on the Monongahela to 23.2 cents per ton-mile on the Big Sandy it is clear that some of the river improvements in the basin have justified themselves and that others have passed their peak of usefulness. There is a middle group whose future status should be determined by further inquiry. It is suggested that a study be made to determine if it would be practicable to levy shipping charges for the special services and facilities now provided at government expense. New navigation projects may well wait such determination."

As to the Red, Arkansas, White and Ouachita rivers the report says: "Navigation is possible on all four streams for varying distances, and a considerable amount of federal money has been spent on channel improvements, but the actual use made of these facilities is minor and no further improvements are recommended."

The 242-page report is based on studies extending over a year by a group of leading scientists and technicians. The committee was assigned the task by the President, with instructions to prepare a plan for the use and control of water within the Mississippi drainage basin, including 31 states. Most of the recommendations deal with the use and control of water for purposes other than navigation. The Mississippi Valley committee has now been reconstituted as the technical committee on water planning of the National Resources Board, which last week made public its findings and recommendations. The members of the Mississippi Valley Committee were Morris L. Cooke, consulting engineer, Philadelphia, chairman; Harlan H. Barrows, chairman of the Department of Geography, University of Chicago; Herbert S. Crocker, consulting engineer, Denver; Lt. Colonel Glen E. Edgerton, Corps of Engineers; Henry S. Graves, dean, School of Forestry, Yale University; Major General Edward S. Markham, Chief of Engineers; Charles H. Paul, consulting engineer, Dayton; Harlow S. Person, consulting economist, New York; and Sherman M. Woodward, professor of hydraulics, State University of Iowa.

Toll Charges Suggested

A rather careful balance seems to have been aimed at in so far as expressions on many of the points in controversy between advocates of water transportation and those more interested in rail transportation are concerned. "Certain disadvantages attach to any river development," the report says, but, on the other hand, "some waterways have continued to prove economically justifiable," and "we need new estimating, accounting, and cost-finding technique not only to weigh the advantages and disadvantages of river transportation but to determine the proper place of inland waterways in a co-ordinated national transportation system." It may be desirable "to introduce a new element by imposing charges where they are justified by special services and special facilities and where the traffic can bear them," the committee says, but "until we know more than we do today it is difficult to suggest a policy as to the extent and nature of the charges for the use of navigation facilities provided at government expense."

The committee does not regard it as necessary, nor indeed practicable, to use waterway projects—either actual or potential—for the general regulation of railroad rates, but at another point it observes that "water transportation has sometimes had a chastening effect on railroad rates."

Any national navigation policy should comprehend a careful and comprehensive study of the economic justification of proposed new improvements on inland waterways, the report says. "It is believed that this phase of the subject has in some instances in the past been too lightly considered—if considered at all. Economic justification should be definitely established early in the study of any proposed river or canal improvement." Also the committee believes that, in the long run, and as a general policy, all transportation rates should be based on the whole cost of the service rendered. A system of accounting is required through which the capital investment as well as maintenance and operating costs on any given going new navigation project can be currently determined. But it suggests a plan for taking out of consideration a large part of the capital investment by saying that in figuring investment it should be recognized that outlays previous to a certain date have been "amortized by time, if not through accounting procedure." A summary of the report includes the following as to navigation:

Navigation: Inland waterways in the United States fixed the lines which the first westward migrations were to follow. As highways, canals and finally railroads were thrust westward from the Atlantic coast, waterways lost their supreme significance. Nevertheless they have continued to play a part in the national life, billions of dollars have been invested in them, and they have a romantic and traditional interest which cannot be disregarded.

Certain disadvantages attach to any river development: Rivers are crooked and often do not follow normal lines of traffic movement; reshipment is often necessary; variations in the water level make it difficult to establish proper docking and warehousing facilities; the northern waterways are closed by ice during many months of the year.

On the other hand some waterways have continued to prove economically justifiable; inland waterway transportation has sometimes had a chastening influence on railroad rates; and there is already a large federal, state and local investment in waterways which would be lost if they were abandoned. Furthermore, navigation may well be part of a plan which provides also for irrigation, flood control, low-water control and power development. We must measure its costs and advantages in their relation to some or all of these other elements.

Down to the end of 1932 the United States government had spent a little less than two billion dollars on river and harbor improvements, of which 94 per cent was expended after 1882, 74 per cent after 1906, and 46 per cent after 1920. Of this amount about a billion and a half dollars were chargeable to navigation alone, and about $440,000,000 to navigation on the Mississippi river system. We have 27,406 miles of inland waterways which are legally defined as navigable, of which 12,798 miles—nearly half—are in the Mississippi system.

These legally navigable channels are in some cases no more than that. We need new estimating, accounting and cost-finding technique not only to weigh the advantages and disadvantages of river transportation, but to determine the proper place of inland waterways in a coordinated national transportation system. It may be desirable to introduce a new element by imposing charges where they are justified by special services and special facilities and where the traffic can bear them.

The movement toward ultimate unification might be hastened by the setting up of a commission to regulate water rates and to cooperate with the Interstate Commerce Commission in fixing joint rail and water rates. In time, with experience and with the accumulation of data which we now lack, the two agencies might be combined.

The chapter in "A National Inland Waterway Policy" is in part as follows:

A National Inland Waterway Policy

Up to seventy-five years ago the bulk of the commerce of the United States was water borne. Even today we have some water routes carrying heavy tonnages on an economic basis. The national investment in waterways runs into the billions. While such facts afford wholly inadequate guides for future national policy as to river improvements, they do suggest racial and national instincts and institutions to be dealt with both considerately and rationally.

In the face of this need for poise and deliberation the discovery is easily made that in the discussion of general policy, or its application to individual projects, advocates rather than impartial judges, partisans rather than disinterested technicians, have the public ear. Back of the appeals of the proponents of river navigation projects is seen all too frequently only a drive for lower railroad rates and this usually with no special regard either to the economics or equities involved. On the other hand, it is

equally clear that sometimes the opponents of such projects are actuated, consciously or unconsciously, by a desire to protect a vested interest in some competing mode of transport.

There is one universally held theory and that is that all methods of transportation should be "coordinated." However, when one gets down to particulars this coordination too frequently is apt to mean some adjustment as between trucks, railroads, and waterways held to be advantageous by the one making the suggestion.

Adequate Transportation Basic

The maintenance of an effective comprehensive transportation system is possibly the most fundamental, immediate problem that we have to face. A nation with our territorial extent, population, culture, and vital dependence of one section upon another, is unique. It has been made possible only by an elaborate and adequately supported railroad system. Therefore any move, however desirable it may be in itself, which unduly infringes upon the serviceability of railroads, is to be deprecated.

In justification for those who oppose the extension of our waterway system it must be remembered that we do frequently keep on doing things just because we have done them in the past. On the other hand back of the drive for waterways there are frequently vested interests seeking special privileges.

There are technical arguments against river developments entirely disassociated from cost considerations:

(1) The disadvantageous courses of many rivers (circuitous or athwart the normal lines of traffic movement).

(2) The inflexibility of water transport and the associated fact that comparatively little freight can move wholly by water from a point of origin to a point of consumption, defects that may entail relatively heavy costs for reshipment.

(3) The impracticability of fixing wharfs, docks, and warehouses on the banks of most inland rivers because of the great variation in stream levels.

(4) The closure of northern waterways in winter, with resulting seasonal suspension of traffic.

But in recognizing every plausible objection to be cited against extensions to our system of inland waterways we should not lose sight of some further pertinent facts:

(1) The privately owned railroads have been consistently opposed to virtually all waterway transportation without discriminating appraisal, the control of which they could not secure.

(2) Essential and proper rate revisions on railroads have in certain instances come about only through waterway improvement.

(3) There are inland waterways in operation in our country, the economic justification of which is generally admitted.

(4) Government—federal, state, and local—already has a large investment in waterways which it probably would be quite impossible, if not unwise, to ignore.

Public and Private Rights and Obligations

If the government is to retain the confidence of our people it must be reasonably careful in all actions which affect private interests so as to safeguard the real equities involved. But we must here as elsewhere have in mind that the public and the private interest are of wholly different orders. Government frequently cannot effect the largest good of the greatest number without infringing private rights. The Constitution affords protection or compensation for a genuinely injured party. Therefore, it may be a feeble argument against a waterway to say that it is going to injure a privately owned railway or even the railway system as a whole. A railroad is no more free from the outcome of technological evolution or of new social institutions, than is the corner grocery store. Under free institutions there can be no absolute and final restriction on the things government can do if the people desire to do them. Hence waterway policy even if it perpetuates a toll-free system may be sound from the standpoint of institutional democracy, even if it be costly from the standpoint of the budget makers.

Every variety of transportation facility—rivers, railroads, highways, and airways—has received subsidy at one time or another. The wisdom of a subsidy must be judged by the situation at the time it is granted. When certain transcontinental railroads were subsidized through land grants the country was in dire need of these cross-country routes to overcome delays and inconveniences of the covered wagon and the mule train. Transportation subsidies in the past—in theory at least—have been considered warranted only where there has been an urgent need for the expansion of transportation facilities not readily procurable through private initiative. Certainly the warrant for transportation subsidies in a period of vast and rapid expansion is much more apparent than at present when we are having difficulty in holding and consolidating our economic position.

In reaching conclusions that are to hold through a considerable term of years, as is inherent in the Mississippi Valley Committee assignment, it is not feasible to build too exclusively on what is, or, especially, on what has been. One should have in mind that in making assumptions as to what the transportation system of 40 to 50 years hence should be, all the mistakes and lack of efficiency so much a part of the present can be largely ignored, because of the good offices of amortization and obsolescence. To plan 50 years ahead is, as it were, to plan with a clean slate.

Transportation modes and transportation routes are peculiarly open to obsolescence. But both the very large investments usually involved and the far-reaching relations of the public and private interests that may be affected by change, frequently warrant retaining facilities long after their profitableness from a strictly accounting standpoint has disappeared. This logic applies to waterways and railroads alike, once they are established, even though later developments raise a question as to the wisdom of the original investment.

Had we no noble streams, such as the Columbia, the Delaware, the Hudson, and the Mississippi, tying our interior by obvious transportation routes with the open ocean, and no great inland seas such as the Great Lakes and, particularly, if we had never gone in for inland waterways, our problem would be different. But we are in it, and in it deep, and probably to stay, if only for the reason that development or regulation of a given river may be desirable from one or more standpoints other than navigation. Irrigation, flood control, low-water control, and power development, one or all, may incidentally improve the navigability of a river. So our task is to take the situation as it is—not as any one of us would construct it anew—and plot a reasonably logical future with the present as its base.

Outlays for Rivers and Harbors

The policy of improving rivers and harbors in the United States under federal direction and with federal funds was begun more than a hundred years ago. The first appropriation for the improvement of the Ohio (first member of the Mississippi System to receive attention) was made in 1824. The total of the appropriations for rivers and harbors from the inception of the work to June 30, 1932, including flood control, is $1,941,779,999.

Table I.—Comparison of Total Amounts Appropriated by Congress by Specified Dates for Rivers and Harbors

To June 30—	Aggregate of appropriations	Percent of total appropriated to June 30, 1932
1882	[1] $111,299,465	6
1906	[2] 515,427,432	26
1910	[3] 660,604,210	34
1915	[3] 853,737,951	44
1920	[3] 1,041,805,547	54
1925	[3] 1,311,597,443	67
1932	[3] 1,941,779,999	100

[1] River and Harbor Improvements 1789-1883, House Doc. No. 64, 48th Congress, 1st session.
[2] Transportation by Water, Bureau of the Census, 1906.
[3] Annual Reports, Chief of Engineers, U. S. Army, for years indicated. The last three items include flood control.

The amounts stated for 1882 and 1906 are not on the same basis as the others, but the discrepancies are not sufficient to be significant. These data indicate that during the period 1920-1932 almost as much money was appropriated for rivers and harbors as during the hundred years preceding 1920.

Some part of the expenditures for flood control on the Mississippi river is properly chargeable to navigation, but the amount thereof is difficult of determination, for some construction serves both purposes. As a matter of fact, of the $325,000,000 authorized by the act of May 15, 1928, for flood control on the Lower Mississippi, $100,000,000 was charged against navigation.

The total expenditures of United States funds up to June 30, 1932, when adjusted in the manner heretofore indicated, to exclude amounts not attributable directly to navigation of the rivers and harbors of continental United States, is reduced to $1,534,862,753. This amount includes the value of plant, materials, etc., on hand, accounts receivable and accounts payable. The cost of new work is $1,062,217,931, and maintenance $435,812,044 subdivided as follows:

	Cost of new work	Cost of maintenance
Seacoast harbors and channels	$444,684,556	$163,553,714
Lake harbors and channels	157,190,628	41,126,585
Mississippi River System	377,816,695	61,274,077
Intracoastal canals and other waterways	82,536,052	27,817,860
Operation and care of canals	.....	116,858,340
Miscellaneous	.....	25,181,467
Total	$1,062,227,931	$435,812,043

Some portions of through waterways may have large tonnages,

while other portions may have extremely low tonnages. A given river which may have been canalized to carry parts of these tonnages may now be maintained at a relatively high cost, and in itself may not have been worth the price that was paid for its development. However, if the particular stream has become a traffic feeder for a main route, such as the Ohio or the Mississippi, its abandonment is open to serious question. This is especially true if the cost deficit which the stream in question sets up is fully reflected in the picture of costs for the system as a whole. The reluctance to change transportation systems or modes, however, becomes highly objectionable when carried too far.

Perhaps the rapid transition to pipe lines for carrying oil may be cited as a well advised shift. Pipe lines certainly represent a direct improvement in transportation. This improvement came about because of industry's ever watchful demand for lower cost transportation methods, the appearance of new technical facilities and economic conditions, and the power of a great industry to make the necessary investment.

Waterways and Railways Complementary

Similarly we have developed inland water routes which carry millions of tons of products. The water routes were first developed because of the movement of the early pioneers into the vast inland areas. Then the railroads came, and proved through their greater flexibility and ability to tap regions not close to the rivers, a great transportation asset. Both the railroads and the waterways serve at varying costs the transportation needs of the country and in each area sometimes at rates largely based on the competition. Because the water routes are free to many private and common carriers, and have been developed over a long period of years at the expense of the national and state governments, it is contrary to sound reasoning to think of abandoning them simply in order that this additional freight may be carried on the railroads. Any expansion in transportation facilities to meet an eventual increase in traffic should be along the lines of the most economical investment and development.

Importance of Coordination

In recent years a tremendous highway development has taken place over a large portion of our country. The automobile brought this about. Automobile trucks operated by enterprising business men have grown tremendously in number, simply to serve better the transportation necessities of our nation. The auto truck is here to stay, to serve various classes of work and carry various classes of commodities.

But so are the railroads here to stay. They will probably continue to be, for an indefinite period, the backbone of the transportation facilities of the country. The pipe line systems are here to stay, for a very long period to serve various and particular functions, largely in the field of petroleum and its products. Similarly, the waterways are here and in some localities are of such importance that additional money for maintaining and for increasing their capacity can be well spent.

But it should be stressed that a definite plan for transportation as a whole, incorporating all of these various methods, is needed. The objective is a definite plan to continue every variety of facility, and to expand each when necessary, so as to provide a system which will give us the benefits of the lowest cost transportation.

Necessity for Cost Data

Irrespective of the disposition of questions of policy, reasonably exact cost data should be available on all proposed waterway projects so that public opinion can be informed before binding commitments are made. Both accounting and cost finding techniques have now progressed to the point where they constitute fully developed and independent arts, quickly appreciated and utilized by industry. It will constitute a real step forward when government learns to avail itself of them.

Only those outlays reasonably chargeable to navigation should be included in these navigation costs. Where a river project is built for joint or multiple use, each of the purposes—recreation, power, flood control, etc.—should have allocated to it the proper percentage of the total outlay.

The nation undoubtedly needs more definite and disinterested data to show the relative costs, taking in *all* factors, of transporting commodities by inland waterways in comparison to other media of transport. Factual data are needed on this subject to establish justification or nonjustification for either the building or continuation of any waterway program whether it be extensive or limited. The same type of cost data will be required for other means of transportation if the absolutely necessary comparisons are to be made.

Rates Based on Costs

In the long run, and as a general policy, all transportation rates should be based on the whole cost of the service rendered. But this policy today is not feasible as to rail rates; first, because dependable data as to rail costs are not now available and, second, because if they were available the social interest in many instances would not be served by a too rigorous application of rates based on costs. Where communities and industries have been built up through what was, or has become, preferential treatment as judged by cost of service, moderation must frequently be used in applying rates based wholly on costs. Therefore cost as the single basis for rates cannot be too rigorously enforced in other parts of the transportation field.

It is not regarded as necessary, nor indeed practicable, to use waterway projects—either actual or potential—for the general regulation of railroad rates. Such rates should be regulated to the extent necessary to guard the public interests with due regard to the existence of competing modes of transportation whether the latter are similarly regulated or not.

Nor is it necessary to deprive an existing railroad of the freight which it may be able and willing to transport, with at least an operating profit, in competition with a waterway, merely to swell the traffic on the latter. But the economic value of the waterway cannot always be determined solely upon the basis of the tonnage actually carried; due credit should be given for the reduction in transportation rates whether or not actual transport remains with the railroad.

Generally speaking, reasonable charges should be levied on new projects. This should not be so interpreted as to preclude promotional rates during the development period. Where making such charges would bring about the disuse of facilities already in existence, and especially where the government is under no material expense for maintenance and operation, it would be unwise to levy charges on such existing projects. The policy should be generally to charge something where special services or special facilities are provided.

In further consideration of this matter we should know that a considerable body of the well informed feel that a charge for the use of inland waterways would be, under the present rate set-up and relations with the railroads, unduly restrictive and tend to divert traffic from the waterways. The railroads with their heavy overheads are in a strong position to cut rail rates more or less indefintely to capture or hold increments of traffic which otherwise might be water borne.

The policy of the government should look toward the establishment of a more scientific basis for rate making, based upon cost and kind of service. A revamping of the entire rate structure of the country would appear to be essential before a properly co-ordinated system of transportation can be effected.

Unification of Waterways

Given an inland waterways system, the better unified it is, other things being equal, the better. A unified system, if any, must necessarily be the objective, and not a more or less useless collection of disconnected segments of varying widths and depths. Public policy has been too vacillating, and lacking in consistent and energetic attack. As a result public expenditures for waterways have been proportionately ineffective. Again if we are to have improved waterways they should be used.

In order to obtain the best results, it is believed that a greater degree of local cooperation should be required if the federal government is to participate in the development of waterways on a large scale. If a project is worthy of recognition by the federal government, it is worthy of some local participation. There is always danger of insistent pressure upon the federal government for the expenditures of money upon projects which have not been maturely considered and which, if part of the burden were chargeable to the localities in which they are advocated, might not be presented to the Congress.

Where waterways have been begun, they should be completed, generally speaking, unless it has become clear that they are lacking in economic or social justification. Where the estimated expense is considerable, and especially where the economic or social justification is responsibly questioned, procedure might well be as in the case of new projects.

Advantages of a Waterways Commission

It is strongly held by some interested in waterway transportation that it would not be wise policy to place waterways under the jurisdiction of the I.C.C.—a body which up to the present time has been largely concerned with railroads, of which the problems are becoming progressively more complicated and exacting.

Perhaps a master move toward the eventual coordination of railroads, waterways, and all other modes of transport would be the setting up of a commission to regulate water rates and cooperate with the I.C.C. in setting joint rail and water rates. Through such an agency the whole waterway situation could be studied. Thus there would be promulgated an outlook and practices as to water-borne traffic which, through general discussion,

can ultimately gain some measure of technical and public approval. After public opinion has been given a chance through the broad functioning of such an agency to arrive at some basic conclusions, the consolidation of all federal regulating agencies might easily become the next logical step.

Following the appointment of such a waterways commission, one of the first duties would be the determination of the reasons why so small a percentage of the present commerce of the nation is now moving on our inland waterways, why the barge lines now operating on our costly waterway system cannot develop and, especially, hold their fair proportion of freight traffic, and why the possibilities of such streams as the Hudson go practically unused. Also, it would be enlightening to know why it is that in countries where railroads are owned wholly or in part by the state (France, Germany, Belgium, etc.), and where impairment of railroad values by water navigation would naturally be guarded against, there have been consistent policies of development of water navigation, whereas in the countries in which railroads are privately owned there has been no such national waterways policy.

It is tragic that in a matter so obviously important as is inland waterway transportation such data as are available should receive so little common recognition. Until this factual situation is generally understood, public opinion will remain grounded largely on guesswork and the whims of the moment.

Additional discussion of the results of river improvements for navigation purposes is included in chapters on the separate basins, showing the relation of the traffic to the cost incurred by the government and that proposed for additional improvements.

Upper Mississippi Region

In its original condition the Upper Mississippi was navigable at certain seasons throughout its entire length, and before the advent of railroads was the most economical route to the northwest. River traffic reached its peak in the decade 1850-60, when it is said 1,100 steamboats plied the upper river. From then on the river traffic was unable to meet the competition of developing railroads; in part because of inadequate depth and obstructions, but chiefly because the rivers, unlike the railroads, were at right angles to the direction of traffic. The Congress of 1878 approved a project providing for a 4.5-foot channel; and in 1907 the present project, which first provided for a 6-foot channel on the main stem above St. Louis, and lesser channels on tributaries, but was modified in 1932 to provide a 9-foot channel on the main stem. The federal expenditures on projects of the Upper Mississippi system above the mouth of the Ohio to June 1934 were: on the main stem, $104,300,000, and on tributaries and connections $21,750,000, a total of $126,-050,000, not including $40,000,000 for maintenance and operation. The estimated cost of completion on the present project as it now stands is: for main stem, $91,300,000, additional expenditures on tributaries and connections being estimated as negligible. The maximum traffic since continuous records were begun on the stretch between St. Paul and the mouth of the Missouri was 4.5 million tons in 1903. The minimum was in 1916 with 500,000 tons, between which point and 1,000,000 tons it has since varied. The great decline has been the result mainly of diminishing traffic in logs and lumber.

It is not possible by any calculations of business accounting to discover an economic justification for the vast expenditures on the projected improvement of these waterways; especially from the prevailing viewpoint of self-liquidation, but also even from the viewpoint of complete coverage of costs of maintenance and operation. It is the more impossible when consideration is given to the fact that diversion of grain traffic from railroads, which is included in present calculations, is quite likely to be checkmated by the highly probable development of through water traffic from the Great Lakes by way of the St. Lawrence river to the Atlantic. On the other hand, there is nothing in past experience which permits us to envisage the total situation of productivity and exchange of commodities between the upper, central, and lower reaches of the Mississippi basin, and connected regions, when there shall exist these great arteries of water transport of adequate depth throughout the entire valley and connected with the Great Lakes. Especially is this true in view of the fact that present studies of planned utilization of natural resources indicate the need of a comprehensive program of new allocations of land to more varied uses, which will inevitably include renewal of traffic in heavy commodities; and in view further of indications of a more decentralized and widely distributed industry.

In the absence of outstanding and pivotal water factors, the Upper Mississippi Valley offers, with one exception, no defined project of magnitude having an obvious federal interest. The exception to which reference has just been made is completion of the present project for a nine-foot channel to the Twin Cities. While an economic justification for it cannot be computed by any standard business accounting formula, the committee does not recommend its discontinuance. There are two reasons for this. First, it is part of a program which already has been authorized by the Congress; second, there is a strong argument that the main stem of the great river should be made one navigation unit from its mouth to these regionally important headwater cities and natural navigation terminals; and, incidentally, that the river system should be tied into the Great Lakes system.

The Ohio Basin

No large region in the United States can boast better or more varied transportation facilities than those serving the Ohio basin. Railroads, highways, and waterways all have been developed to a high stage of efficiency. Because of this condition there is in this region an unusual opportunity for the coordination of various transportation media.

Railroads, the basic American transportation agency, serve all of the more important sections of the basin. In the prosperous productive northern district every city, town and farm is on or near at least one railroad. Main lines and branches are so close together and run in such a variety of directions that they cover this district like a net. In addition to the Ohio proper, numerous tributaries have been improved for navigation at a cost of some $240,000,000. The project depth for the Ohio is nine feet; that for the tributaries now averages about six feet, but the more important ones are being improved to offer facilities comparable with those on the main stream.

Private carriers—largely coal and steel companies—now transport more than 95 per cent of the total commerce on the Ohio river. Most of this traffic moves over only small sections of the available waterway. However, the freight carried by the entire Ohio river system in 1929 was 40,000,000 tons, and the yearly ton-mileage, in a good year, reaches a total of over 3,000,000,000.

The large volume of water-borne traffic on certain parts of the Ohio river system is accounted for to a large extent by the fact that the river flows in the direction of main traffic movements. Furthermore, bulk commodities, especially adapted to water hauling, are present in large quantities; water supply is sufficient for navigation throughout the year, with few exceptions; the climate is favorable for almost continuous navigation. The Monongahela leads all inland rivers of the country in volume of traffic. The Ohio itself carries more river traffic than does the Mississippi. Practically all this traffic is handled by private carriers who pay no tolls. In other words, under present policy, the construction costs and the operation and maintenance costs of navigation projects are at federal expense, and no part of either of these costs is directly returned to the government. The committee believes that this policy should be modified (see "A National Inland Waterway Policy").

Table 6 lists the existing navigation projects in the Ohio basin exclusive of those on the Tennessee river, which are being included in the development program of the Tennessee Valley Authority and therefore are outside the scope of this report. The costs shown do not include costs of operating the boats, nor of handling the freight, but are federal costs only, no part of which is being paid by the users of the waterway. In some of these cases, however, the savings to the users are sufficient to provide for repayment to the government of interest charges and operation and maintenance costs, in case such policy (recommended by the committee wherever feasible) is adopted.

Rearranging the projects listed in Table 6 according to costs per ton-mile, they take the following order:

River	Cost to the United States per ton-mile
1. Monongahela	$0.001
2. Green and Barren	.004
3. Ohio	.005
4. Kanawha	.009
5. Kentucky	.014
6. Muskingum	.016
7. Allegheny (slack-water portion)	.019
8. Youghiogheny	.023
9. Cumberland (above Nashville)	.024
10. Rough	.026
11. Cumberland (below Nashville)	.036
12. Little Kanawha	.074
13. Allegheny (open-channel portion)	.089
14. Tradewater	.10
15. Big Sandy	.232

It should be noted that all of these ton-mile costs are based on a year of heaviest traffic, giving the project the benefit of favorable conditions. Considering the first four in the foregoing list, a not excessive charge per ton-mile would return to the government its cost of operation and maintenance, interest on the investment, and, over a long period of time, all or a

large part of construction cost. It is estimated that improvements now under way on the Kanawha will increase traffic and reduce ton-mile costs to about $0.007. While these are only four of the fifteen projects listed, they represent 85 per cent of the total cost.

As to the last four in the list, the ton-mile costs are so high that there is little hope of any substantial returns to the United States for its construction and operation expense, or any part thereof. Nor is there any reasonable prospect of future traffic that will justify more than minimum possible operation and maintenance costs, except possibly on the Allegheny, where the Chief of Engineers estimates that a nine-mile improvement will bring additional traffic that will result in a ton-mile cost of about $0.0055. These four projects represent only 1.2 per cent of the total cost of those listed.

Projects numbered 5 to 11 in the list are in the intermediate class and conditions may develop whereby some of them might justify a charge that would return to the government its operation and maintenance costs and perhaps part of the interest on its investment. Proposed future expenditures on these projects should be studied carefully with that thought in mind.

On the Ohio river are now being built two new fixed dams which will eliminate six of the existing dams on the main stream and also three on the Kanawha river; three new modern structures will also replace seven dams on the latter stream. The Allegheny river is likewise being modernized in its lower section by construction of two new dams replacing three obsolete structures. The dams on the Cumberland river are being raised to provide a navigable depth comparable to that available on the Ohio. On the Green and Barren rivers modern locks of adequate dimensions are being constructed at two existing dams. The estimated cost of this work is $26,000,000.

Insufficient data are available to justify the proposed extension of the Youghiogheny project, and an estimate of additional traffic is needed to justify the proposed improvement on the Cumberland.

The proposed betterments on the Green and Barren rivers and the proposed improvement of the Nolin river, in the opinion of the committee, should await a reconsideration of policy whereby cost to the government would be repaid by shippers who receive the benefit.

The same comment applies to proposed work on the Allegheny.

At Youngstown, Ohio, and vicinity there is strong local sentiment urging the government to undertake the Beaver-Mahoning project to provide a 12-foot channel, to assure a 9-foot navigable depth, from the Ohio river to Struthers, Ohio, a distance of 35 miles. The cost of construction is estimated at $47,000,000, of which 10 million is proposed to be carried by local interests; the estimated annual cost of operation and maintenance is $640,000. Assuming that $37,000,000 of the construction cost to be carried by the United States will be charged off annually at 4 per cent ($1,480,000 per annum) and, adding the annual operation and maintenance cost ($640,000), the annual cost to the United States would be $2,120,000. Estimated annual traffic according to the best figures available is 6,000,000 tons or 192,000,000 ton-miles. According to these estimates, the federal costs would be 35 cents per ton or $0.011 per ton-mile. Proponents of the project claim savings of from 50 per cent to 100 per cent in excess of those figures. The principal direct beneficiaries would be about six or eight large steel mills and perhaps an equal number of other heavy manufacturing or utility interests.

Compared with other navigation projects in the Ohio basin, the ton-mile cost ($0.011) for proposed U. S. investment in construction plus operation and maintenance costs, is higher than that on the Monongahela ($0.001), the Green & Barren ($0.004), the Ohio ($0.005), and the Kanawha ($0.009), although, as has been said, prospective users could probably afford to repay this cost if that were the general policy. Unless or until an arrangement can be made whereby beneficiaries under a liberal repayment schedule will return to the government its cost of construction, operation, and maintenance, it is suggested that a new project of this class might better be held in abeyance pending reconsideration of a new navigation policy.

The Missouri Basin

The main stem of the Missouri river is being improved for navigation in the face of great obstacles and at an expense which has very doubtful justification. The obstacles hindering its effective development and use as a waterway include both the nature of the river itself and the nature of the transportational needs of the basin. The rather short navigation season in the middle and upper reaches of the river, the low flow in late summer and autumn (normally peak seasons in the traffic of the basin), the shifting natural channels, the unstable bottom, from which flood waters pick up here and there huge quantities of silt that are deposited at various points farther downstream, the similarly unstable banks in most places, the almost complete lack of navigable tributaries to serve as branch lines of traffic, the general direction of flow from the vicinity of Williston, N. Dak., to Kansas City, one that is directly athwart the dominant course of traffic, and the sparse population and low population-supporting capacity of most of the country along the upper reaches, are factors that restrict the commercial usefulness of the river and that make for great difficulty and great expense in attempts at its improvement.

Fort Peck Reservoir will cost at least $86,000,000, and, in addition to improving the navigability of the river, probably will yield immediate benefits in connection with power development and flood control having a capitalized value of $10,000,000. Further expenditures may make possible ultimate power and irrigation developments with an estimated capitalized value of $40,000,000. The channel improvements above Kansas City will cost about $77,000,000, and those below that city about $20,000,000. Thus, the total construction cost for the improvements under way will not be much, if any, below $250,000,000.

Assuming that the more optimistic estimates of future traffic on the river will be realized, the savings to shippers which would result from free operation of the waterway would exceed by only a small margin the annual charge to be borne by the public for maintenance and interest on the investment. If fees were levied with a view to reimbursing the government for the cost of maintenance only, the volume of traffic, doubtless, would be reduced materially and the savings to shippers would be vitiated in large measure. Most current estimates of prospective tonnage are exceedingly liberal, and if the present traffic on the section below Kansas City may be accepted as in any degree indicative of future prospects,[1] the probability of those estimates ever being realized even on a free waterway is very slight.

The only tributary waterway the improvement of which has been maintained in recent years is the Osage river. It is improved for a distance of 75 miles above its mouth to a project depth of 3 feet at a total cost of $1,286,000 and is maintained at an average annual cost of $18,500. The average annual tonnage that moved on the river in the period 1928-1932, excluding construction materials for Bagnell Dam, was 1,480. Fees sufficient to reimburse the government for the cost of maintenance alone would have amounted to $3.50 per ton-mile.

Recommendations: (1) That no further navigation projects in the Missouri Basin be undertaken until the present project for the improvement of the Missouri below Sioux City is completed, and its benefits, if any, have been determined. (2) That the Osage river project be abandoned.

Southwest Rivers

Notwithstanding the fact that since 1828 the Red river has been designated as navigable for 550 miles above the mouth, the fact remains that there is no actual navigation above Alexandria, Louisiana, 122 miles from the Mississippi. Total tonnage in 1931 amounted to only 26,000, which consisted largely of sand, gravel, and freight for levee construction. While there is considerable cotton and lumber to be moved out of the Red river basin, return water-borne freight is not available. As a result river navigation which was in the antebellum days an important factor in the development of the southwest and in the growth of such communities as Alexandria and Shreveport, has been virtually supplanted by rail and highway transportation. Canalization, bank protection, and regulation of flow can be combined to maintain a six to nine foot navigation channel, but the cost, it is estimated, would be about 15 times greater than the probable benefits. Expenditures for navigation purposes on the Red river are not justified except in a few localities.

Up to the beginning of the present century navigation was active on the lower reaches of the Arkansas river. The traffic reached its peak in 1907, when 104,593 tons, valued at over $2,000,000, were shipped. As a result of various factors these movements of package freight and forest products have of recent years practically disappeared from the river. However, some 577,000 tons of sand and gravel were hauled locally for short distances (generally less than three or four miles) in 1931.

The legal head of navigation is at present considered to be the mouth of the Neosho (Grand) river, 465 miles above the mouth of the Arkansas. However, except for the local sand and gravel movements centered at Ozark, Dardanella, Little Rock, and Pine Bluff, no commerce exists upstream from the latter point (117 miles above the mouth), and less than 6,000 tons of commercial freight moved below that point in 1931.

Between 1832 and 1931 a total of $4,220,000 was expended by the federal government for navigation improvements on the

[1] In a letter to the Secretary of War, dated September 30, 1933, the Chief of Army Engineers said: "There is practically no commercial traffic on the Missouri River at present except that incident to sand and gravel dredging and to ferry operation. The reported commerce in 1929 between the mouth and Kansas City was 1,160,000 tons and between Kansas City and Sioux City, 209,000 tons. Of this, all but 1,300 tons consisted of construction materials moved by river contractors."

Arkansas river. The major portion of this sum was spent prior to the adoption of the present project in 1902. Comparatively small sums have been expended since 1916.

Various navigation projects have been proposed by local interests. The most extensive would provide a nine-foot channel from the mouth to Tulsa, Oklahoma, at an estimated cost of over $200,000,000. The expenditure of such a sum, or any other large sum, for the purpose of improving this stream for navigation appears to be without adequate economic justification.

Water-borne traffic on the White river is limited to 331 miles on the main stem, 213 miles on the Black river and 94 miles on the Current river. The cost of increasing the channel depths is not justified, except as a byproduct of flood control or power development, for only 240,000 tons are carried on the river annually and existing navigation needs are being provided for at present. The federal government has expended about $1,900,000 for open-channel work on the three rivers of the White river system, and about $2,000,000 for locks and dams on White river, or a total of $3,900,000 for navigation improvement.

Nine Mills Per Ton-Mile Subsidy To Shippers

Just as there is some danger that the flooded areas adjacent to the main stem may be used to induce uneconomical federal expenditures in the relatively near future, so too, the main stem itself may receive expenditures for navigation out of proportion to the actual benefits, direct and indirect, to be derived from them. The total cost of improving the Mississippi river for navigation in the section between New Orleans and Cairo may be estimated conservatively at $190,000,000. This includes $110,000,000 spent, or to be spent, under the Adopted Plan. The average annual maintenance costs are at least $2,700,000. During the period 1928-1932 the average annual traffic, exclusive of material used in government work and the coastwise and foreign petroleum traffic below Baton Rouge, was about 1,681,000,000 ton-miles. If this volume of annual traffic continues unchanged the total government subsidy provided shippers by water would be, at the time of completion of the work now under construction, about 6 mills per ton-mile. Allowing for the meandered course of the river, involving distances by water that are some 50 per cent more than those by rail, the actual public expenditures, when reduced to a basis comparable to expenditures for rail haulage, would be approximately 9 mills per ton-mile. More than two-thirds of the traffic moved in the section below Vicksburg. Grain, cotton, and sugar were prominent items in through movements. With the exception of short hauls of sand and gravel, the use of the stream for local commerce was inconsequential. The Mississippi is a traffic artery of national, rather than local, significance. Its value as a unit in the national transportation system is generally thought to be great, but the matter seems to merit more thorough and comprehensive consideration than it previously has received.

In an effort in part to encourage greater use of the river, Congress created the Inland Waterways Corporation in 1924. Since 1926, traffic carried on the lower river has declined slightly. The corporation appears not to have shown an appreciable net income from traffic operation, notwithstanding its exemption from taxes and from various administrative expenses. It has arranged many joint rates, has secured an increase in the minimum width of channel maintained, and has financed or helped to finance the construction of various municipal terminals.

For the future the question of expenditures for navigation is treated as part of a gigantic scheme for the development of water resources for electric power, flood control, low water control, navigation, irrigation, recreation, a widespread development of rural electrification, and an extensive national reserve against unemployment, on the theory that, although a given expenditure may not be economically feasible for a single purpose, when given multiple interconnecting purposes its economic status may show a decided improvement.

THE UNITED STATES CIVIL SERVICE COMMISSION announces that applications will be received until January 30 for positions as telephone engineer for the Federal Communications Commission, at salaries ranging from $3,200 to $5,600 a year; and for positions as telegraph engineer at salaries from $2,600 to $4,600. Men are wanted with broad education and experience and, according to the notice, it is highly desirable that these positions, especially those of the higher grades, be filled with men having high-grade and responsible engineering experience in those fields; including experience in connection with the work of regulatory bodies.

How Avoid Government Ownership?

(*Continued from page 860*)

Railroad officers could not give any one of their representatives power to bind their companies because any proposed action would necessarily be subject to ratification by the stockholders; besides, some railroad officers may have a certain reluctance in consolidating themselves out of their jobs!

Even the public authorities, as exemplified by the various state public utility commissions, are not in a position to ratify any plan which might be made on their behalf. This would have to be done by the legislative bodies of the various states.

Therefore, we come back to a dictatorship which, while probably necessary in an emergency like the present, is always unwelcome. It might almost be said that the Co-ordinator has been appointed for this particular job, although neither his title nor the law creating his present position gives him the requisite authority. The writer urged him for this position in private conversation to a number of leading railway officers after writing a series of articles on this particular subject for the *Railway Age*, nearly 5 years ago.

Based on some of his previous utterances, this gentleman is supposed to be in favor of government ownership although he has not expressed himself on this subject lately except by saying that the time for this had not arrived. If he is still of the same mind, it is probably due to two reasons:

1—That he has seen private management loath to co-ordinate for efficiency and believes the government could hardly do worse.

2—That he thinks everyone would work as earnestly and disinterestedly for the government as he does himself.

The writer believes, based on experience elsewhere and within the United States, that government ownership would be much worse than existing conditions. Furthermore there is no sentiment in favor of it in this country, neither among the people at large nor among the shippers. If it is brought about it will be entirely due to lack of intelligent leadership in the transportation industry and on the part of all the groups which have an interest in it.

Presumably Co-ordinator Eastman will recommend at the forthcoming session of Congress some plan containing more or less the principles outlined herein. Then Congress will give the various interests an opportunity to be heard. We are in the hands of the duly elected representatives of the people who, according to the theory of democracy, should represent the sum of accumulated wisdom, although we may have serious doubts about this being the case. We can but hope that the proper weight will be given to the opinion of the experienced leaders among the various interests affected, and that not too much attention will be paid to torch bearing evangelists.

It also appears quite reasonable to expect that the legislation likely to be passed will create an improvement over present conditions in the transportation industry, because these could hardly be worse. It is also quite certain that whatever the legislation may be, it will be neither perfect nor final.

THE CONSTRUCTION OF OVER 10,800 NEW PASSENGER AND FREIGHT CARS has been planned under an extensive building program to be undertaken during 1935 by the London, Midland & Scottish of Great Britain, the Associated British Railways, Inc., New York, reports. British railway business, the statement continues, has shown steady improvement and the prospect of continued good business is largely responsible for the new L. M. S. program.

Odds and Ends . . .

New Railways

Announcement of the building of a new railway anywhere in the world these days is indeed news, but the Swiss government goes even further and announces that contracts have been let to build two new railways to add to its efficient system. Both are mountain railways. One up Mount Diavolezza will start at 7,009 ft. above sea level and go to a point 10,033 ft. high. Another railway, to the summit of Mont LaChaux, will start at 4,926 ft. and reach an altitude of 7,019 ft. The first will cost approximately $500,000, the second $400,000.

Ticket Redemption After 64 Years

The Southern Pacific recently made refund of $1 on a railroad ticket and believes that it thereby set a record for the length of time elapsing between the purchase of the ticket and its redemption. This particular ticket was purchased more than 64 years ago by Frank Elder, 79-year-old pioneer resident of Lincoln, Cal., who kept it through the years and finally offered it for refund only as an oddity. The ticket covered transportation from Rocklin, Cal., to Lincoln, a distance of 14 miles, and was purchased on July 10, 1870, from the Central Pacific, now a part of the Southern Pacific.

"Casey's" Conductor

The man who clocked Casey Jones on that famous trainman's last run, and one of the few remaining members of the crew that "railroaded" with Casey, is dead. J. C. (Chap) Turner, conductor for years with Casey, died at his home in Canton, Miss., on November 9. He was 72 years old. He was employed by the Illinois Central for 50 years.

Turner often recalled circumstances surrounding Casey's last run. The engineer and his crew had just completed their regular run north and then took the south run back, owing to illness of members of the other crew.

As related in song and verified by Turner, Casey was running late and had "turned on the steam." When rounding a sharp curve near Vaughan, Miss., the locomotive left the rails, killing Casey and his fireman.

Locomotive Photos

A new hobby that is rapidly claiming the attention of thousands throughout the country, is the collecting of engine pictures. First sponsored by groups of local enthusiasts, this hobby has become so popular that collectors have formed a co-operative, non-profit organization known as the International Engine Picture Club with headquarters at 280 Broadway, New York City, to facilitate the exchange of such pictures. This club now has several thousand members in all corners of the world. Membership is free to anyone interested. There are no initiation fees or dues. Among its members one finds collectors who prefer to specialize in pictures of new and old motive power, electricity or steam, local or foreign. Others whose interests are more general save all kinds of railroad views including trains, stations, bridges, cars, snow plows, etc. Not only do the members of the International Engine Picture Club collect engine pictures, but also old timetables, train orders, old prints, pottery, currency, postage stamps and other material depicting the progress of American railroading.

Hauling the President

Three dollars a mile is approximately what it costs to transport a President of the United States by rail. The cost varies little with the distance traveled, but may vary much with the state of public sentiment toward the President. The more precautions needed, the greater the expense. Pennsylvania officers estimated the cost of moving President Roosevelt from Hyde Park, N. Y., to Washington, at upwards of $1,000 for a trip of between 300 and 400 miles. President Hoover's trip to Des Moines, Iowa, during the last campaign probably cost close to $50,000, they figure. Farm prices were near their record lows then, and unrest was prevalent. On the Pennsylvania, when a President travels, no freight train is allowed to pass his train on adjoining tracks. Rerouting freight traffic so that there will be tracks between the Presidential special and any moving freight trains thoughout the journey is in itself a major task.

"Crank" letters cost the railroads money. They mean special inspections of rails and roadbed and special guards for the more vulnerable points along the line. Where traffic is not normally heavy, a pilot train must be sent ahead of the Presidential special. No train is permitted to follow the President's for half an hour or an hour. At bridges, guards are equipped with flashlights with which they signal "all's well."

THOMAS W. PHELPS,
Wall Street Journal.

More Nicknames

One anonymous correspondent in Atlanta, unidentifiable except that he has a telegrapher's "fist," has sent in some 30 or 40 railroad nicknames. His latest batch includes:

Detroit & Mackinac—Defeated & Maltreated.
Atlantic Coast Line—Atlantic Clothes Line.
Bangor & Aroostook—Bang-up & Arrogant.
Boston & Albany—Before and After.
New Orleans & North Eastern—No Omelettes & No Eggs.
Carolina, Clinchfield & Ohio—Corn, Cotton & Oats.
West Virginia Central & Pittsburgh—Watch Very Carefully & Proceed.
Colorado & Wyoming—Carpenter & Walrus.

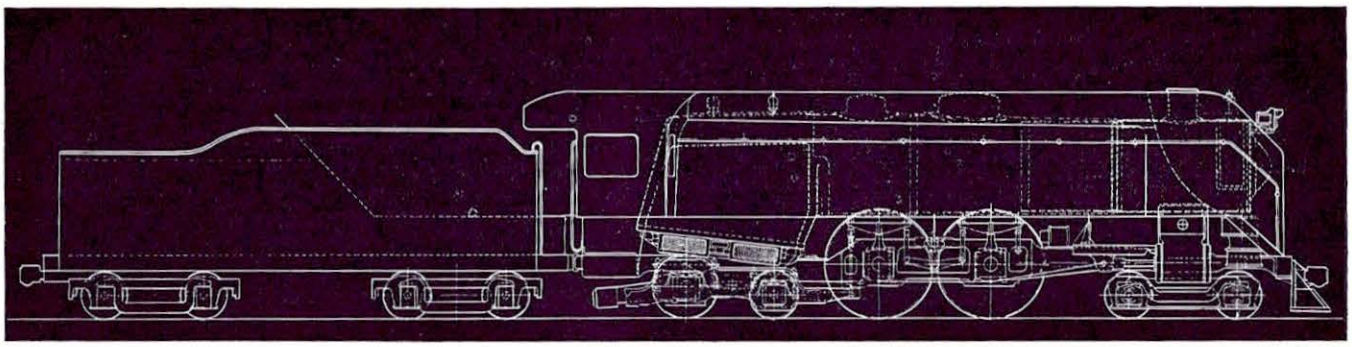
Largest Railroader

There being no other claimants to the above title, this department hereby awards the mythical prize of a bottle of reducing salts to John Winstead, laborer on the Norfolk & Western, pictured herewith. John is 45, weighs an even 400 lb. in fighting trim, collar size, 21, No. 11 shoe.

"Big John" Winstead

News Department begins on next left-hand page

Streamlined Super-Power Locomotive
(Described in Railway Age Sept. 29th)



Stream-Lined Super-Power *for* High Speed Passenger Trains

Locomotives of this type are ideally suited for high speed passenger service.

They combine light weight, high speeds, low fuel consumption and economical maintenance for both equipment and track. They also permit flexibility of train operation.

Stream-Lined Super-Power Steam Locomotives alone provide every essential for efficient, economical and safe train operation.

LIMA
LOCOMOTIVE WORKS
INCORPORATED
LIMA OHIO

NEWS

C. & N. W. Plans First High-Speed Steam Train

Road's expedited Chicago-Twin Cities service to be inaugurated on January 2

The first high-speed standard steam-driven passenger train designed to compete with modern streamlined light-weight Diesel-electric trains will be placed in service by the Chicago & North Western on January 2 between Chicago and the Twin Cities, 481½ miles, on a seven-hour schedule. Decision to operate this standard steam train followed the announcement of the Chicago, Burlington & Quincy that it had ordered two light-weight streamlined trains which it would place in service between Chicago and the Twin Cities in February.

The new train will be operated over the same route as is taken by other North Western Twin Cities trains and will stop at Milwaukee, Wis., Adams and Eau Claire, the schedule being such that the maximum average speed attained between stations will be about 75 m.p.h. The northbound train will leave Chicago at 3:30 p.m. and arrive in Milwaukee at 4:50 p.m., St. Paul at 10:30 p.m. and Minneapolis at 11 p.m. In the opposite direction the train will leave Minneapolis at 3:00 p.m., St. Paul at 3:30 p.m. and Milwaukee at 9:10 p.m. and will arrive in Chicago at 10:30 p.m. Provisions have been made so that persons living between Chicago and Milwaukee may board the train at the latter point.

While the new train cuts two hours and fifty minutes from the fastest North Western Twin Cities schedule, it also cuts the present fastest time between Chicago and Milwaukee, 85 miles, from 90 minutes to 80 minutes. The North Western's train, which will be known as "The Four Hundred," the name signifying mile-a-minute service—408½ miles in 425 minutes—will be drawn by an E-2 class (4-6-2 type) locomotive, which has been converted to use oil instead of coal and on which the driving wheels' diameter has been increased four inches, or to 79 inches, in order to make possible speeds of 100 m.p.h. or more.

Both northbound and southbound trains will consist of five modernized and completely air-conditioned steel cars, including one baggage-coach, one standard coach and one lounge coach, one dining car and one parlor-observation car. The interiors of these cars have been redecorated in bright colors and new seats have been added. Roadbed preparations for the new train have been under way for the last three months and have included reballasting, curve elevation and complete testing of rails by a Sperry rail detector car. Preparation of the roadway was facilitated by the fact that the North Western had laid considerable new rail during the summer in keeping with the usual program of replacements. In announcing the new train and precautions taken in preparation, the North Western calls attention to the fact that "for four consecutive years it has won the award for safety among Class A railroads," and expresses its belief "that 'The Four Hundred' is destined to take its place among America's foremost trains."

Disastrous Collision at Dundas, Ontario

In a rear collision of passenger trains on the Canadian National, at Dundas, Ontario, on Tuesday evening, December 25, fifteen persons were killed and 31 injured. An eastbound regular passenger train ran over a misplaced switch and into the rear of a preceding excursion passenger train which had entered the siding about 10 minutes previously, for the purpose of cooling a hot journal. All of the injuries, both fatal and non-fatal, occurred in the rear cars of the standing train. Two of the killed were parlor car porters.

Passengers on the westbound International Limited, who were delayed a considerable time because of this accident, had the experience the following morning when they reached Harvey, Ill., near Chicago, of being in another accident, a derailment, the locomotive of their train having struck an automobile at a highway crossing. In this accident, seven persons, the occupants of the automobile, were killed. The train ran a long distance beyond the crossing. The reports indicate that the leading truck of the locomotive was the only portion of the train that ran off the rails.

R. R. Credit Corporation to Make Thirteenth Distribution

E. G. Buckland, President of The Railroad Credit Corporation, authorized the following statement:

The Railroad Credit Corporation has announced that it will make a liquidating distribution on December 31 of $735,993, or one per cent, to participating carriers. Of this amount, $354,932 will be in cash and $381,061 in credits. This will be the thirteenth liquidating distribution that has been made to participating carriers since liquidation began on June 1, 1933, and will bring the total amount distributed to $20,627,177. The authorized distributions aggregate 28% of the $75,422,410 fund after deduction of the $1,753,918 direct refunds in reimbursement of taxes paid on revenues involved.

P.W.A. Outlines Effects of Its Loans to Railroads

Approximately 150 million man-hours of employment created, says Administrator Ickes

Approximately 150,000,000 man-hours of employment, extending into every state, were created this year by PWA railroad loans, Public Works Administrator Harold L. Ickes announced in reviewing nation-wide results of a year's campaign to create jobs for unemployed by making self-liquidating loans to railroad companies. Loans to 30 railroad companies amounted to $193,276,500 of the PWA fund.

More than 52,000,000 of these man-hours were worked by men and women called back to regular employment by railroad companies and equipment manufacturers. The balance was worked by men and women called back to work by production of more than $100,000,000 worth of materials and supplies purchased by the railroad companies and equipment makers. This indirect employment was created in the heavy industries, where unemployment was most acute.

These are actual accomplishments of one year's effort on the railroad phase of the PWA program. The contract for the first railroad loan was signed by Administrator Ickes on December 29, 1933. It was for a loan of $77,000,000 to the Pennsylvania.

When the railroad program was at its peak this summer 70,000 men and women were directly employed by the railroad companies and equipment manufacturers, and it is estimated that about twice as many men and women had been called back to work by industries in every section of the country where both raw and finished materials were being produced and processed.

With $145,000,000 paid out to railroads by PWA, most of the program finished and the balance nearing completion, 25,000 men and women still are directly employed by the railroad companies and equipment manufacturers, and many more thousands are indirectly employed on materials and supply production.

Reviewing separately the results of each phase of the PWA railroad improvement and construction program, Administrator Ickes pointed out that:

1. Loans of $133,886,250 were made to 23 railroad companies for improvements and construction work to be done by their own employees in company shops and on rights of way.

2. Up to November 15, the latest date for which complete and exact information

(*Continued on page 875*)

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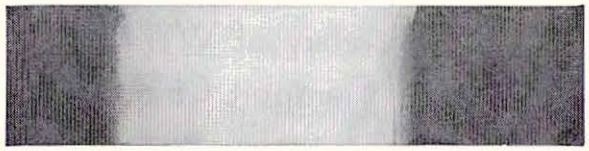
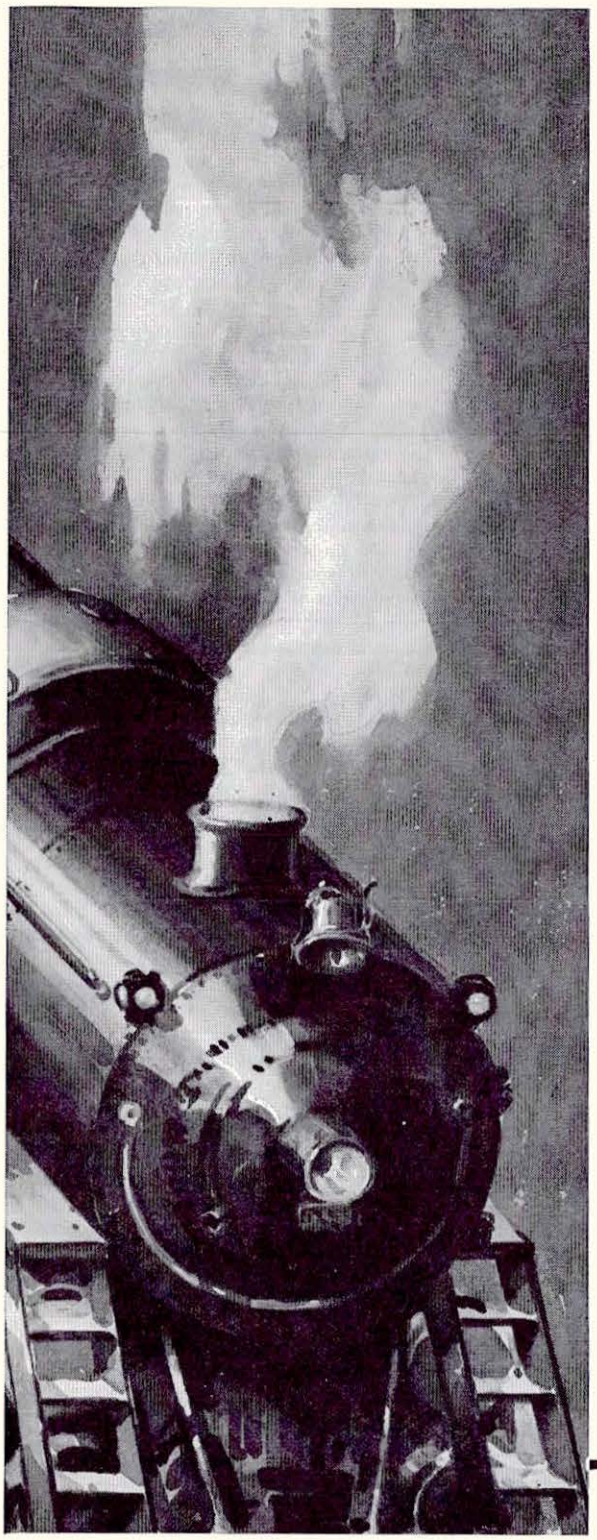


Don't bunch up the Slack—

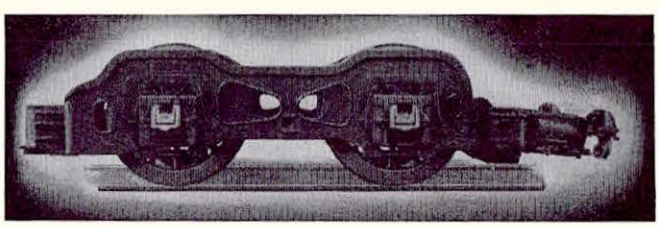
Use The BOOSTER



With a Booster locomotive, the extra capacity of the Booster provides a powerful steady pull that avoids the need of "bunching" with its subsequent damaging yank at every coupler in the train.

It also avoids overstressing every part of the motion work of the locomotive itself.

The Booster pays for itself in reduced locomotive maintenance. It also pays a handsome return in reduced damage to lading, couplers and draft gears, and in reduced break-in-twos.



Booster repair parts made by the jigs and fixtures that produced the original are your best guarantee of satisfactory performance.

FRANKLIN RAILWAY SUPPLY COMPANY, Inc.

NEW YORK CHICAGO MONTREAL

R. F. C. Assumes Control of Denver & Salt Lake

Government body votes road's stock which had been pledged as security for loan

In accordance with conditions imposed by the Interstate Commerce Commission and the Reconstruction Finance Corporation last month in approving and authorizing a loan of $3,182,150 to the Denver & Salt Lake Western to enable the Denver & Rio Grande Western to complete its purchase of stock of the Denver & Salt Lake, the R.F.C. on December 21 assumed control of the latter by voting the stock in the company, which had been pledged with the corporation as security for loans, to elect as president of the company Wilson McCarthy, of Oakland, Calif., a former director of the R.F.C., succeeding W. R. Freeman. A. A. Berle, Jr., counsel for the R.F.C., also was elected a director of the railroad.

The D. & S. L., which operates through the Moffat tunnel, and the connecting Dotsero cutoff, constructed by the D. & S. L. W., are controlled by the D. & R. G. W., and Mr. McCarthy explained in Denver that the action taken does not mean that the federal government is "going into the railroad business" but that the R.F.C. "is moving into the picture in order to protect its security in loans made to the D. & R. G. W., and the D. & S. L. W." The arrangement will be in effect only until the loans are paid. The Rio Grande has borrowed $7,362,000 from the R.F.C. In other instances the R.F.C. has imposed conditions on the managements of roads to which it has made loans, including reductions in the salaries of officers and in other ways, but this is the first instance in which it has assumed control.

In 1930 when the Interstate Commerce Commission authorized the Rio Grande to acquire control of the D. & S. L. by purchasing stock at $155 a share it imposed conditions requiring it to purchase minority stock which might be tendered to it at the same price and also requiring the completion of the Dotsero cutoff, which connects the line of the Salt Lake through the tunnel with that of the Rio Grande, shortening the distance from Denver to Dotsero by 174 miles as compared with the distance via Pueblo. In September, 1932, in extending the date for compliance with the conditions, the commission required the Rio Grande to deposit with a Denver bank 20,530 shares of voting trust certificates of the Salt Lake as collateral for its obligation to purchase an equal amount of shares or certificates on or before January 2, 1935. The 20,530 shares owned by the Rio Grande were also pledged with the R.F.C. as part security for a loan made in 1932 and 8,940 additional shares were pledged as part security for another loan of $3,850,000 made to finance the construction of the cutoff.

As the D. & R. G. was unable to complete the purchase of the minority shares in January, the D. & S. L. W., a subsidiary which built the cutoff, obtained a loan from the R.F.C. for the purpose, offering as security a note of the Rio Grande secured by pledge of not less than 37,776 shares nor more than 41,060 shares of the Salt Lake, of an outstanding issue of 50,000 shares. The commission required as a condition that the voting power in the stock be vested in the R.F.C. and this was provided for in the loan agreement with the R.F.C.

Stock representing control or part control of other railroads has been pledged with the R.F.C. as collateral in several other instances but unless the R.F.C. should find it necessary to foreclose on the collateral it does not give the corporation voting power and if such a contingency should be reached the government corporation would be one among many creditors. The voting power was turned over to the R.F.C. in the Denver & Salt Lake case because of the special circumstances surrounding the transaction.

New York Central Streamlined Locomotive Exhibited

The "Commodore Vanderbilt," the New York Central's streamlined steam locomotive, which was described in the *Railway Age* of December 22, page 825, was on exhibition at Grand Central terminal between 8 a.m. and 10 p.m. on December 27 and 28.

C. N. R. Raises Wages

Announcement was made in Ottawa last week by A. R. Mosher, president of the Canadian Brotherhood of Railway Employees, that an agreement had been reached between the brotherhood, representing clerks, freight handlers, shop roundhouse and station employees on the Canadian National and the C.N.R. management, providing that, in the case of all employees whose basic wage rates had been reduced by 15 per cent, this deduction will be at the rate of 12 per cent effective January 1, and 10 per cent as from May 1, 1935, with proportionate modifications for those whose rates were subject to a 10 per cent deduction.

The management has announced a similar restoration in the wage rates of unorganized employees.

Long Island Exhibits New Passenger Coach

An experimental steel motor-equipped passenger car, which is to be tested by runs over all parts of the Long Island system early next year, was placed on exhibition December 27 at the road's Jamaica station. The new car is streamlined and is of a color resembling aluminum instead of the standard Tuscan red which has adorned Long Island passenger coaches for years.

The special car, fitted out in Long Island shops, will be tried out first on the Port Washington branch. Long Island officers say they are especially interested in testing the qualities of the aluminum coating used on the car, known under the trade name of "alumaneal," which is said to possess both sun-deflecting and insulating properties, making the car cooler in summer and warmer in winter. The protective coating is described as neither a paint nor varnish but rather a thin sheathing of aluminum metal.

Secretary of War Urges Transport Co-ordination

Dern discusses affairs of the Inland Waterways Corporation in his annual report

Reconsideration by Congress of its declared policy as to the development of transportation is urged by Secretary of War Dern in his annual report in connection with his discussion of the affairs of the Inland Waterways Corporation. He now urges a declaration by Congress that it is its policy to "promote, encourage, and develop all forms of transportation, to the end that the public shall have the best and cheapest transportation system available, and that participating carriers in joint service performed shall receive for their part of the service performed a compensatory revenue." After outlining the history of the Inland Waterways Corporation, Secretary Dern said in part:

"Since the beginning of the depression all accomplishments toward achieving a satisfactory rate structure have largely been swept away in the resulting struggle for existence among the competing forms of transportation. The remarkable growth of new forms of transportation, particularly automotive trucks, made serious inroads on railroad traffic at a time when the railroads were already suffering from general lack of business. Barges were naturally put into the same category as trucks, and the result was cutthroat competition and instability throughout the entire transportation world. Under such turbulent conditions, all cooperation by the railroads with the barge lines, looking to the establishment of satisfactory joint rates, came to an end.

However, it must now be apparent to both the railways and the waterways that their best interests, and the welfare of the public, lie in the co-ordination and cooperation of all forms of transportation rather than in destructive competition. The crying need of the Inland Waterways Corporation at this time is to achieve a self-supporting rate structure.

"Operations of the corporation have also been impeded and interrupted by inadequate river channels. On the lower Mississippi and Warrior rivers there has usually been a constant flow of water sufficient to operate towboats and barges. On the upper Mississippi operations have repeatedly been suspended on account of low water, but with the completion in another 2 or 3 years of the series of locks and dams now under construction, there will be a dependable channel so that operations may be carried on without interruption. On the Missouri river water transportation cannot safely be initiated until the stabilization of the channel is finished and the Fort Peck Reservoir is completed so as to insure a regulated stream of ample depth.

"The Inland Waterways Corporation earned a net profit of $66,786.28 in the year ending December 31, 1933. The consolidated net profit for the period June 1, 1924, to December 31, 1933, amounts to $706,692.57. Although there has been only a small decline in tonnage carried during the present calendar year, there has been a

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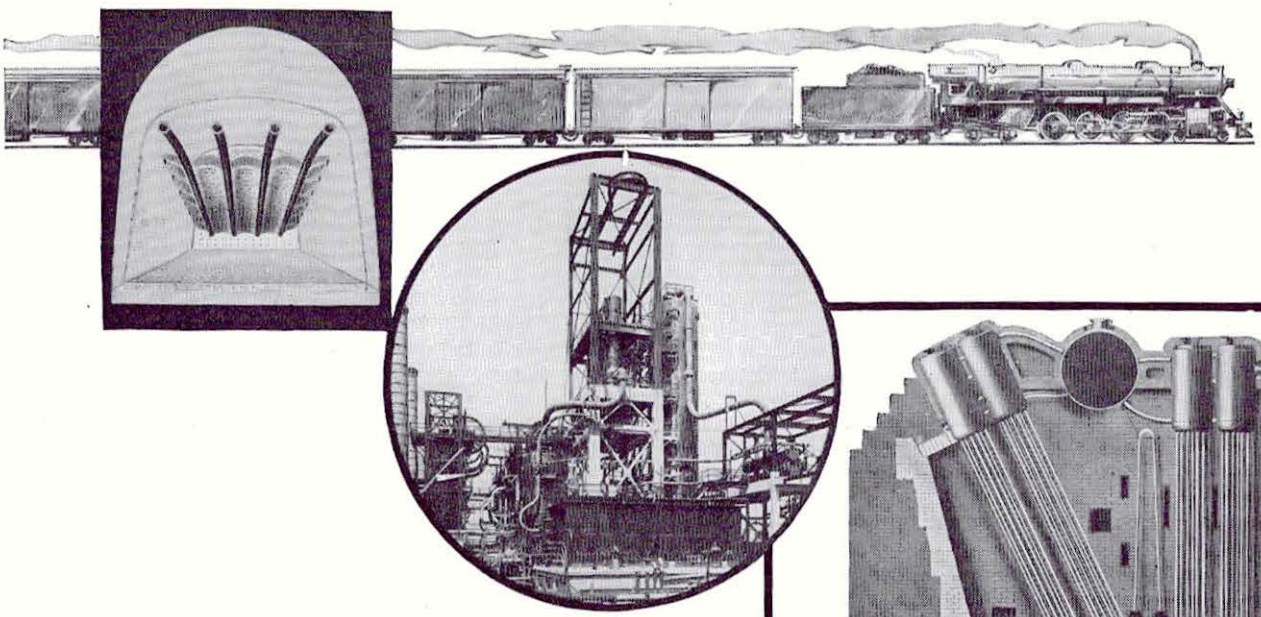
Wherever There Are Industrial Combustion Problems *You Will Find*

THE AMERICAN ARCH COMPANY



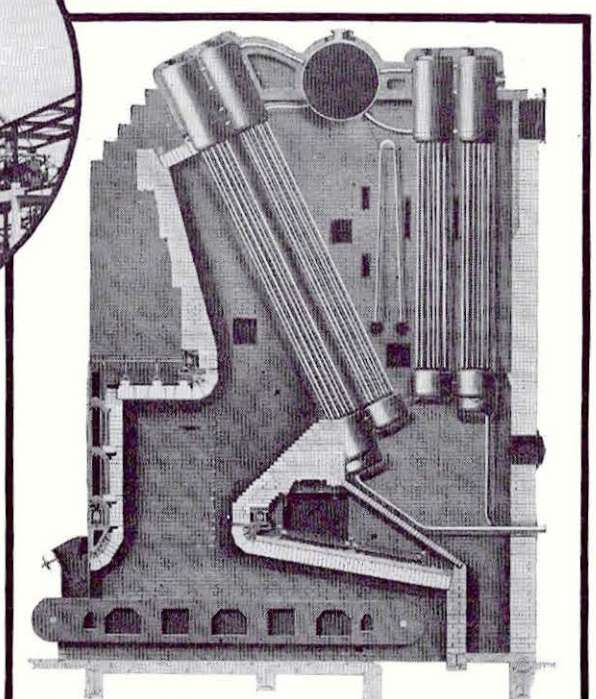
In steel plants on the largest heating furnaces you will find American Arch Suspended Roofs.

In great central station plants you will find American Arch air-cooled walls and suspended Arches.

In the most modern oil refineries, again you will find American Arch roofs and air-cooled walls.

All industry has come to value the counsel of American Arch Company on combustion problems; as have the railroads for nearly a quarter of a century.

This counsel is only one of the many advantages of American Arch Company service to the railroads.



Modern installation of chain grate stoker with American suspended arches and American sectionally supported air-cooled front and side walls designed for burning lowest grade anthracite screenings.

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THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK

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AMERICAN ARCH COMPANY

INCORPORATED

Locomotive Combustion Specialists

NEW YORK CHICAGO

marked decline in revenue, accompanied by an increase in expenses due to partial restoration of pay cuts and a general advance in prices of supplies.

"The reduced revenues in recent years and up to the present time are the result of the fierce rate war which has been so destructive in the ranks of the transportation world. The Inland Waterways Corporation, being specifically charged to foster and preserve in full vigor both rail and water transportation, has at no time wanted a rate war and disclaims responsibility therefor. While the shipping public has been benefited by this destructive competition, it is not the mission of this corporation to reduce rates by any such indirect method. The last thing it wants to do is to demoralize the transportation situation.

"I have a deep interest in the development of inland water transportation and its potential benefits. Cheap transportation means the cheap assembly of raw material, which is always the prerequisite of an industrial development which brings in its train increasing population, pay rolls, and new high-class freight tonnage. In this development transportation plays such a vital part that no useful form should be destroyed. By their regulated co-ordination and cooperation monopoly will be prevented and the public will be best served. With the proper vision our transportation policy can be so shaped as to attain this end. The essence of such a policy is a self-supporting rate structure for each kind of service, at the same time giving the public the economies inherent in each form. It follows that rates should be based on the lowest possible costs for good service, to be rendered at a reasonable profit and under fair labor conditions."

Bus Lines Ask Suspension of Reduced Passenger Fares

John M. Meighan, secretary-manager of the National Association of Motor Bus Operators, has asked the Interstate Commerce Commission to suspend tariffs of the Southern and other southeastern lines proposing to continue to the end of September, 1935, the present basis of reduced passenger fares, one and one-half cent a mile in coaches and three cents a mile in sleeping and parlor cars.

A. A. R. Traffic Advisory Committee

A. F. Cleveland, vice-president in charge of the Traffic Department of the Association of American Railroads, has appointed a traffic advisory committee, composed of heads of railroad traffic departments and traffic associations, to consult with him on problems of the railroads as a whole relating to rate-making policies. The committee consists of the following:

E. B. Boyd, chairman, Western Traffic Executive Committee; C. J. Brister, vice-president, New York Central Lines; C. C. Cameron, vice-president, Illinois Central System; C. R. Capps, chief traffic officer, Seaboard Air Line; R. W. Clark, general traffic manager, Northern Pacific; C. McD. Davis, vice-president, Atlantic Coast Line; W. S. Franklin, vice-president, Pennsylvania; H. H. Holcomb, vice-president, Chicago, Burlington & Quincy; F. B. Houghton, vice-president, Atchison, Topeka & Santa Fe; D. T. Lawrence, chairman, Traffic Executive Association-Eastern Territory; Arthur Mackenzie, freight traffic manager, Chicago, Rock Island & Pacific; E. R. Oliver, vice-president, Southern Railway; C. E. Perkins, chief traffic officer, Missouri Pacific; F. W. Robinson, vice-president, Union Pacific System; J. T. Saunders, vice-president, Southern Pacific Lines; Golder Shumate, vice-president, Baltimore & Ohio; A. R. Smith, vice-president, Louisville & Nashville; J. E. Tilford, chairman, executive committee, Southern Freight Association; F. J. Wall, vice-president, New York, New Haven & Hartford, and F. M. Whitaker, vice-president, Chesapeake & Ohio-Pere Marquette.

Norfolk & Western Finds Air Conditioning Profitable

Air conditioning of its trains, the Pocahontas and the Cavalier, and also of lounge and sleeping cars on four other trains, is included in a program now being completed by the Norfolk & Western. On December 1, the total number of air-conditioned cars was 48, of which 25 are railway-owned. All of the railway-owned units are equipped with 110-volt electrical systems, with 21 units employing electro-mechanical air conditioning and four units (all coaches), the steam-ejector system.

As the result of introduction of air-conditioned sleeping cars, passenger travel in these cars showed an increase of 14 per cent during the three months, June, July and August, 1934, as compared with the same months of 1933. Passenger officers of the railway state that the increase would undoubtedly have been greater but for the fact that an experimental coach fare of two cents a mile, in effect during the past ten months, has caused a heavy patronage of the day coaches. Up to November of this year, coach travel showed an increase of more than 90 per cent over a corresponding period of 1933.

Business Leaders Urge Continued Improvement of Transportation

Ninety business leaders, at a three-day conference last week at White Sulphur Springs, W. Va., called at the joint invitation of the Chamber of Commerce of the United States and the National Association of Manufacturers, adopted a series of resolutions recommending that business should now be permitted to work its way back to normal prosperity with a minimum of government interference and opposing government competition with private business. On the subject of transportation the resolutions included the following:

1. The continuing improvement of our systems of transportation is conducive to economic recovery and essential to the promotion of community prosperity. We are now entering a period of more rapid change and development in transportation than has existed during the past two decades. The potential purchasing power involved in modernization of equipment and the utilization of already known technical development would materially contribute to the restoration of employment in the durable goods industry.

2. The achievement of maximum efficiency demands freedom for development in each field of transportation.

3. To the extent that federal funds are available for loans, it would seem prudent to make loans to national and local common carriers, where financially justified, on terms as reasonable as those made for other purposes. Such loans can be made with greater security in already developed and sound enterprises, with competent organizations to direct them, than to new and untried enterprises.

Hugh M. Tate Elected I. C. C. Chairman

Pursuant to the policy of the Interstate Commerce Commission, Commissioner Hugh M. Tate has been elected chairman of the commission, effective January 1, for the year of 1935. He will succeed the present chairman, William E. Lee. The new chairman was appointed a member of the commission in February, 1930. He is a lawyer by profession. He was born in Morristown, Tenn., September 15, 1882. After taking the degrees of B.A. and LL.B. at the University of Tennessee, he began the practice of his profession in his native town and continued there for six years, during which period he served at various times as county attorney and as city attorney. He moved to Knoxville, Tenn., in 1909, at which place he practiced law until he came to the commission, except for a period when he served as judge of the chancery court. The new chairman has been active in many civic organizations, having, among other public duties, served as president of the Knoxville Chamber of Commerce, the Sons of the Revolution for the State of Tennessee, and the University of Tennessee Alumni Association. He is the present president of the Tennessee Volunteer State Society of Washington.

Restriction Of Telegraph Franks Proposed

The Telegraph Division of the Federal Communications Commission has ordered a hearing to be held at Washington, D. C., on January 14 for the purpose of receiving testimony and argument on proposed rules to govern the issuance of telegraph franks and the giving of free telegraph service. The rules as proposed provide that:

1. Franks may be issued, at the discretion of the issuing carrier, to the following full-time officers, agents and employees of the carriers set forth in paragraph 2 hereof, and to their families, but to no other such officers, employees, agents or families: President, vice presidents, secretary, treasurer, general counsel, comptroller, chief engineer, general manager, general passenger agent, general freight agent.

2. Common carriers not subject to the Communications Act of 1934, whose officers, agents and employees set forth in paragraph 1 may receive franks at the discretion of the issuing carrier from telegraph carriers subject to the Communications Act of 1934, are the following, but no others: Railroad companies, steamship companies, motor bus companies, air transport companies, telephone companies, telegraph companies.

3. Each frank shall name the individual to whom it is issued and shall be good only for messages sent by that individual.

4. Free telegraph service may be ren-

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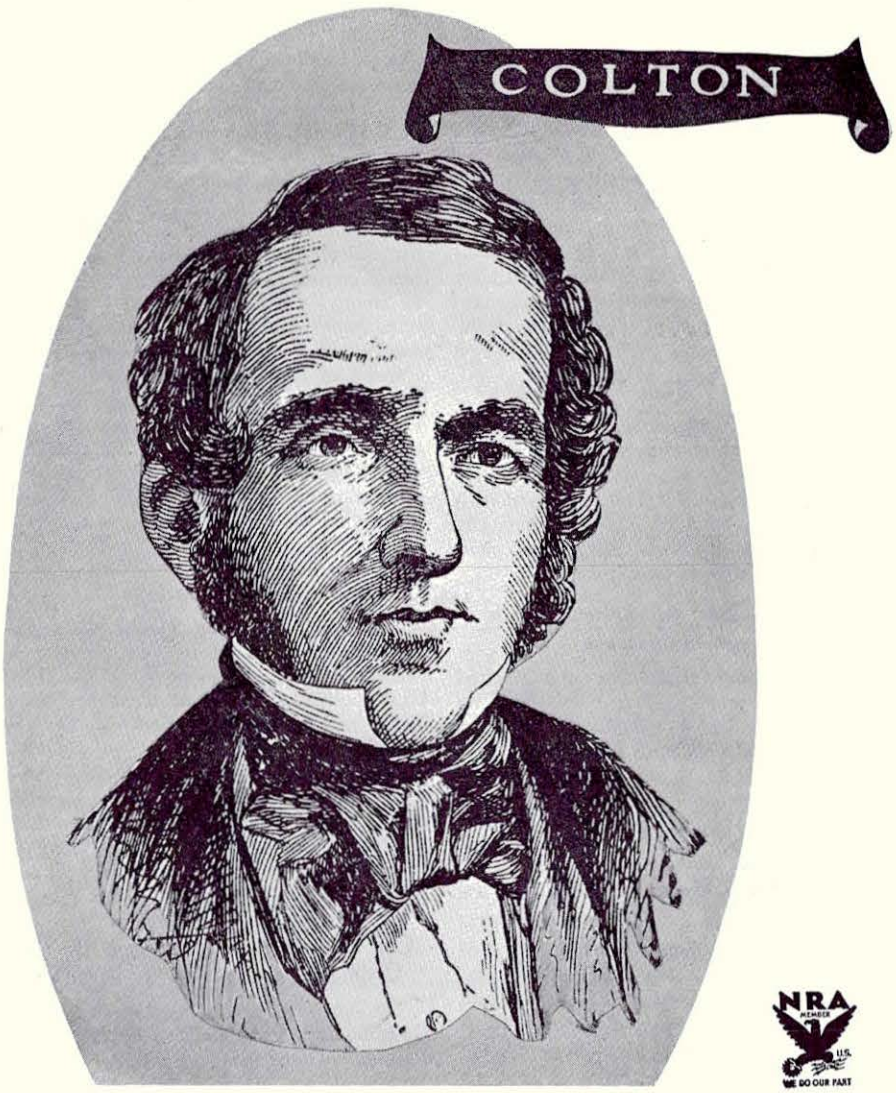
No opinions so fatally mislead as those that are not wholly wrong, as no watches so effectually deceive the wearer as those that are sometimes right.



THIS company maintains high standards of design and manufacture of locomotive superheaters and so cannot accept business on terms that would force *altering* the standards even slightly merely to eke out a profit margin. Perhaps a few shortcuts in engineering and manufacturing methods would not *wholly* destroy the effectiveness and service life of Elesco superheater units—either new or REmanufactured—but opposed to the instances where they would suffice, would be many more where the railroads must lose.

In the REmanufacture of unserviceable superheater units, there is no omission of any of our high standards of design and manufacture of new superheater units. The railroads cannot lose . . . their unserviceable superheater units are REmanufactured at a cost about half that for new units, but to give many more years of the same full-efficiency, trouble-free duty as new units. There are no uncertain welds, no piecing, no weak joints, no restrictions of passages, no shortening of units . . . from which the railroad would be most certain to lose.

A FACT: The Elesco unit REmanufacturing service—by employing the same workmanship, the same rigid tests—as for new units—restores unserviceable superheater units to a condition practically equivalent in every way to that of new units.

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ELESCO

Peoples Gas Building
Chicago

A-929

Canada: The Superheater Company, Ltd., Montreal, Canada

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles

dered only pursuant to a frank issued by a duly authorized officer of the carrier performing the service.

By its order of September 12, the Telegraph Division had required telegraph carriers to submit information with respect to telegraph franks and telegraph messages sent free of charge. An analysis of the returns shows that there were 5,624 employees of railroads or members of the families of such employees holding Western Union franks, of which 589 different individuals sent messages during the period January 1-September 1, 1934, on which the charges would have been $10 or more had the regular charges been made. While these 5,624 persons sent messages in the amount of $48,372.12, the 589 mentioned sent messages in the amount of $47,124.82. In other words, 10.47 per cent of the railroad frank holders sent messages representing 97.4 per cent of the amount of revenue which would have accrued had the regular charges been made on all messages sent by Western Union railroad frank holders.

B. & M. Shops Reopened

The Boston & Maine announces that its locomotive shops at Billerica, Mass., which have been closed since July, will be reopened on January 2. This, together with similar action at Concord passenger-car shops, and Keene motor-car shops, will give work to 650 mechanics.

Supreme Court to Rehear Grade Separation Case

The Supreme Court of the United States has decided to hear reargument on January 16 in a case appealed to it by the Nashville, Chattanooga & St. Louis involving the validity of an act of the Tennessee legislature requiring railroads to pay one-half the cost of grade separation projects on state roads.

Milo S. Ketchum Dies

Milo S. Ketchum, who retired in 1933 as dean of the college of engineering of the University of Illinois, died on December 19 at Urbana, Ill. Mr. Ketchum had a brilliant record as an engineering educator and was the author of many engineering text books. He was born on January 26, 1872, at Burns, Ill., and received degrees at the University of Illinois, the Colorado School of Mines and at the University of Colorado. Before becoming dean at the University of Illinois he had served as dean of the college of engineering at the University of Colorado and as head of the civil engineering department at the University of Pennsylvania.

Fletcher Addresses Chicago Traffic Club

Suggestions that the financial problems of the railroads be solved by reducing capitalization were criticized by R. V. Fletcher, vice-president and general counsel of the Association of American Railroads, before the Traffic Club of Chicago on December 20. Such a course, he said, would help railroad credit little at the present time since there would still be left the problem of the slim margin of safety resulting from the constantly narrowing spread between gross revenues and net income, due to decreased earnings. He also said that the harm that would come to the railroads through repudiation of their obligations would be far greater than any benefit they might expect from reduced capitalization obtained in such a manner. If railroad capitalization were reduced as much as 50 per cent, he continued, railroad credit would not be improved greatly, for the difference between gross and net is too narrow. Railroad expenses are now too high and the roads are facing the necessity of reducing their operating costs in order to increase their net income.

In discussing legislation, Mr. Fletcher forecast favorable action at the coming session of Congress, predicating his view upon the President's desire to improve economic conditions and the fact that general conditions are so closely related to the railroads' recovery that, in order to improve general conditions, it is also necessary to improve those of the railroads. He took issue with the proponents of government ownership of the railroads and warned of the effects of possible radical legislation, including the six-hour day. Mr. Fletcher named three main factors essential to the improvement of the railroads: (1) Regulation of highway traffic; (2) regulation of waterway traffic; (3) modification of the Fourth Section of the Interstate Commerce Act.

Club Meetings

The Northwest Car Men's Association (St. Paul) will hold its next meeting on Monday evening, January 7, at the Y. M. C. A. building, Minnesota Transfer, Minn. There will be a discussion on the new car interchange rules.

The Indianapolis Car Inspection Association will hold its next meeting on Monday evening, January 7, at seven o'clock, at Hotel Severin, Indianapolis. There will be a discussion on the new car interchange rules.

Car Pooling Plan Discussed by Co-Ordinator and A. A. R. Directors

The box car pooling plan proposed by Co-ordinator Eastman's Section of Car Pooling was the subject of a thorough discussion at a conference in New York on December 21 attended by Mr. Eastman and O. C. Castle, director, and N. D. Ballantine, assistant director, of the pooling section, and the board of directors of the Association of American Railroads. The conference was held pursuant to a suggestion made by Mr. Eastman when he transmitted the pooling report to the Regional Co-ordinating Committees representing the railroads on October 23, that at some stage in the consideration of the report they confer with Messrs. Castle and Ballantine and give them an opportunity to talk directly with the railroad representatives and answer any questions which might occur to them. Since then the new railroad association has been giving serious attention to the report, which Mr. Eastman has described as a matter of first rate importance and one which merited direct handling by the railroad executives. Shortly after the report was issued it was discussed at length by a number of superintendents of transportation who were called into conference on the subject with J. R. Downes, vice-president of the Operations and Maintenance Department of the association, after which it was discussed by the executive committee, and, as reported in last week's issue, the association has ordered the most detailed check ever made of the actual daily movements of all freight cars, for a two-week period, which will make possible a complete analysis of the reasons for empty car mileage, classified as to types of cars and direction and as between system and foreign movements. Excessive empty car mileage is given by Eastman's staff as one of the principal reasons for the adoption of a pooling plan.

J. J. Pelley Expresses New Hopes for 1935

The railroads of the United States enter the year 1935 with renewed hopes as to their future, according to a New Year statement authorized by J. J. Pelley, president of the Association of American Railroads. While the past twelve months have not been fully up to expectations, so far as traffic and earnings are concerned, there have been notable accomplishments during the year in other respects.

Outstanding, has been the organization of the Association of American Railroads. This association was formed in order to bring about greater self regulation within the industry itself, improvement in operating methods, to promote co-operative action and, through research, to develop improvements in mechanical and other facilities with a view to improving continually the service to the public and enabling the railroads to keep pace with the industrial development of the nation.

In this new association, more than ninety-eight per cent of the mileage of Class I railroads of the United States, Canada and Mexico have joined, presenting the most united front on the part of the rail carriers in their history in dealing with their common problems.

Although the railroads have, as has industry in general, felt the effects of the depression, rail transportation service has continued to improve. Freight traffic is now being handled nearly half again as fast as it was ten years ago. Due to improvements in locomotives, and in operating methods, it now requires only 120 pounds of coal to haul 1,000 tons of weight a distance of one mile, compared with 149 pounds a decade ago. Many other improvements in facilities and methods of operation have also been made, all of which have been directed to providing the public with the best rail transportation service ever afforded it.

In order to provide greater comfort to the traveling public, nearly all of the principal railroads and some of the smaller ones have air-conditioned large numbers of their passenger cars during the past year. Nearly a dozen roads either have placed in operation or have under construction at this time new stream-lined, light-weight passenger trains.

Partly due to Public Works Administration loans made for the purpose of stimulating employment, the railroads in 1934 installed in service more new freight cars

Continued on next left-hand page

MERRY CHRISTMAS

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET · NEW YORK · N.Y.

HAPPY NEW YEAR

and locomotives than in any year since 1930. New freight cars installed totalled 24,000, compared with 1,874 cars in 1933. On December 1, 1934, they had 1,771 new freight cars on order, compared with 125 the preceding year. Fifty new steam locomotives and 35 new electric locomotives were placed in service in 1934 compared with one steam in 1933. On December 1, 1934, there were 23 new steam and 95 new electric locomotives on order compared with one steam locomotive on December 1, 1933.

Both freight and passenger traffic in 1934 showed an improvement over the two preceding years.

Many Companies to Participate in Exhibit at Chicago

A total of 90 railway supply companies have already contracted for space in the National Railway Appliances Association exhibit of materials and equipment employed in the construction and maintenance of railway tracks, structures, signals and other fixed properties at the Coliseum, Chicago, on March 11-14, inclusive, concurrent with the annual conventions of the American Railway Engineering Association and the Signal Section, A.A.R. Over 78 per cent of the space available in the main building has been allocated and the directors of the association have arranged to lease the north annex of the Coliseum if additional area is needed to accommodate later applicants for space.

The supply companies which have already contracted for space for their exhibits are as follows:

Adams & Westlake Company
American Steel & Wire Company
American Car & Foundry Company
American Fork & Hoe Company
Armco Culvert Manufacturers' Association
Austin-Western Road Machinery Company
Air Reduction Sales Company
Barco Manufacturing Company
The Barrett Company
Bethlehem Steel Company
Carnegie Steel Company
Caterpillar Tractor Company
Chicago Pneumatic Tool Company
Chipman Chemical Company
Cleveland Frog & Crossing Company
Cleveland Tractor Company
Crerar, Adams & Co.
Cullen Friestedt Company
Dearborn Chemical Company
DeVilbiss Company
DeSanno & Son, A. P.
Paul Dickinson, Inc.
Eaton Manufacturing Company
Electric Storage Battery Company
Frog Switch & Manufacturing Company
Gardner-Denver Company
Industrial Brownhoist Corporation
Illinois Steel Company
Ingersoll-Rand Company
Inland Steel Company
International Harvester Company
Johns-Manville Sales Corporation
Jones & Laughlin Steel Company
Jordan Company, O. F.
Kerite Insulated Wire & Cable Company
LeCarbone Company
Lehon Company, The
Locomotive Finished Material Company
Lorain Steel Company
Lundie Engineering Corporation
Magnetic Signal Company
Maintenance Equipment Company
Massey Concrete Products Corporation
Mechanical Manufacturing Company
Metal & Thermit Corporation
Morden Frog & Crossing Works
National Carbide Sales Company
National Carbon Company
National Lock Washer Company
Nichols & Brother, George P.
Nordberg Manufacturing Company
Okonite Company
Oxweld Railroad Service Company
Pocket List of Railroad Officials
Pyle-National Company
Racor Pacific Frog & Switch Company
Rail Joint Company
Railway Purchases & Stores
Railway Track-Work Company
Ramapo-Ajax Corporation
Rawls Company, S. E.
Republic Steel Company
Ross & White Company
Simmons-Boardman Publishing Company
Sperry Products, Inc.
Standard Equipment Company
Teleweld, Inc.
U. S. Wind Engine & Pump Company
Western Railroad Supply Company
Wilkening Manufacturing Company
Youngstown Sheet & Tube Company

Celotex Company
Chicago Flag & Decorating Company
Copperweld Steel Company
Corning Glass Works
Electric Tamper & Equipment Company
Fairbanks, Morse & Co.
Fairmont Railway Motors, Inc.
General Railway Signal Company
Kalamazoo Railway Supply Company
National Aluminate Company
National Lead Company
P. & M. Company
Positive Rail Anchor Company
Railway Maintenance Corporation
Warren Tool Corporation
Weir, Kilby Corporation
Worthington Pump & Machinery Company
Pittsburgh Plate Glass Company
Frog & Switch Manufacturing Company

P. W. A. Outlines Effects of Its Loans to Railroads

(*Continued from page 871*)

is available, the 23 railroad companies had paid $22,837,004.56 in wages for 41,053,541 man-hours of labor by men called back to work in 40 states, and had purchased $73,295,000 worth of iron, steel, lumber, copper, cement and other products of heavy industries. The balance of the $100,000,000 worth of material purchases were made by equipment manufacturers.

3. Loans of $59,390,250 were made to 18 railroad companies to purchase new engines, freight and passenger cars and high-speed streamlined trains manufactured in outside shops.

4. These equipment purchase loans resulted in the placing of orders for 14,675 freight cars, 264 passenger train cars, 70 steam engines, 20 Diesel engines, 33 electric locomotives and 4 high-speed trains. Orders were placed with 26 manufacturers.

5. Latest reports to PWA show that men called back to work to manufacture the new equipment and produce the materials used have turned out 14,425 freight cars, 150 passenger cars and 54 locomotives of all types.

6. The railroad equipment industry is one of the most important branches of the heavy industries and probably the hardest hit by the depression. The regenerative effect on employment in PWA loans to purchase new equipment is shown by the fact that from 1931 to 1933 the industry manufactured only 3,925 freight cars for railroad companies, as compared with the 14,425 turned out this year.

7. Of the $133,886,250 loaned to railroad companies to put their own forces back to work, $65,580,484 was loaned to create employment for shop men. Fourteen companies received loans and have called shop men back to work. They have been employed on the job of repairing, rebuilding and modernizing 35,694 freight cars, 1,694 locomotives and 1,946 passenger cars, and on building 88 new locomotives, 10,736 freight cars and 75 passenger cars.

8. Latest reports to PWA show that 8,292 new freight cars, 73 passenger cars and 8 locomotives have been completed. The repair work also is rapidly nearing completion, with 28,439 freight cars, 1,416 passenger cars and 1,522 locomotives finished.

9. Materials purchased for the use of shop men up to November 15 total $37,532,000. These purchases created millions of man-hours of employment in the heavy industries.

10. Loans totaling $68,305,766 were made to 19 railroad companies to create employment for their track forces, $24,487,968 of this being for purchasing and laying new rails and fastenings. The balance of $43,817,798 was for other roadway improvements, including the Pennsylvania electrification project, for which $37,000,000 was allotted.

11. With the exception of the Pennsylvania electrification, the roadway work is virtually completed. The electrification will be finished and electric operation commenced early in the year. When the roadway improvement program was at its peak more than 30,000 men had been called back to work by the railroad companies.

12. Materials purchased for roadway improvements total $35,732,000, and production of them has created many millions of man-hours of employment in the heavy industries. Among material purchases were $23,000,000 worth of new rails and fastenings.

13. Through the Reconstruction Finance Corporation PWA has sold $13,362,000 of railroad securities purchased in making advances on loans, and the money has been turned into the PWA revolving fund for reallotment to additional projects.

Equipment and Supplies

LOCOMOTIVES

THE ELGIN, JOLIET & EASTERN contemplates buying from one to five Diesel-electric locomotives.

FREIGHT CARS

THE CHESAPEAKE & OHIO, reported in the *Railway Age* of December 15 as contemplating the purchase of 10 self-clearing, light-weight steel hopper cars of 50 tons' capacity, has ordered this equipment from the American Car & Foundry Company.

IRON AND STEEL

THE NORFOLK & WESTERN is in the market for 32,000 tons of 131 lb. steel rail.

THE NEW YORK CENTRAL will receive bids on January 8 for about 1700 tons of steel for twelve bridge on its west side improvements between Forty-second and Fifty-third streets New York, and on January 15 for 8000 tons of steel for the express highway from Seventy-second to Seventy-sixth streets.

Continued on next left-hand page

WHEN WAYSIDE SIGNALS ARE HARD TO "SPOT"

Increased safety of train operation results from installation of "Union" Coded Continuous Cab Signals. Their indications cannot be hidden by fog or storm, and are not subject to misinterpretation by enginemen. *They prevent misreading of wayside signals.*

Our nearest district office will be glad to tell you about the other good reasons for installing "Union" Coded Continuous Cab Signals. No obligation.

10 GOOD REASONS—

—Why "Union" Coded Continuous Cab Signals are effective in improving railway service:

1. Increase safety of train operation.
2. Expedite traffic.
3. Signal indications are continuously visible irrespective of fog, other weather conditions, curves or physical obstructions.
4. Indicate *instantly* any changed condition on track ahead.
5. Permit trains to increase speed *at any point* where a less restrictive indication is received.
6. Determine location of broken rails.
7. Supplemented by audible indication.
8. Cab Signal duplicated on fireman's side.
9. Prevent misreading of wayside signals.
10. Effect operating economies.

1881 **Union Switch & Signal Co.** 1934

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Supply Trade

The **Binks Manufacturing Company,** Chicago, has organized the **Binks Manufacturing Company of Canada, Ltd.,** with offices at Windsor, Ont.

Walter Colpitts, of the engineering firm of Coverdale & Colpitts, New York City, has been elected a director of the **Edward G. Budd Manufacturing Company,** Philadelphia, Pa., and a member of the executive committee.

W. Ward Mohun has been appointed special representative for the **Reo Motor Car Company,** Lansing, Mich. **C. F. Watson** has been appointed divisional sales manager in charge of western and southern territory and Charles Boutelle has been appointed manager of the eastern division.

OBITUARY

Herbert J. Beck, director, assistant treasurer and factory sales manager of Aluminum Industries, Inc., Cincinnati, Ohio, died suddenly at the company's office on December 14. Mr. Beck had never fully recovered from injuries sustained during the World War.

TRADE PUBLICATION

ARC WELDERS.—Characteristics and features of motor and engine-driven welding machines, built by the General Electric Company, are described in a 12-page booklet published by that company under the title "General Electric Arc Welders."

Construction

ATCHISON, TOPEKA & SANTA FE—A contract has been awarded to the Union Bridge & Construction Company, Kansas City, Mo., for the construction of five cylindrical piers under this company's bridge across the South Canadian river at Nobscot, Okla.

CHESAPEAKE & OHIO.—A contract has been given to Haley, Chisholm & Morris, Charlottesville, Va., for constructing the Twenty-fifth street highway bridge, a joint project of the City of Newport News and the Chesapeake & Ohio, at Newport News, Va., at an estimated cost of $99,500.

STANDARD FRUIT & STEAMSHIP COMPANY.—A concession for the construction of a railroad in Mexico has been granted to this company, according to consular reports. The proposed route is from Chilapa, Mex., traversing the state of Tabasco to Santa Rosalia and LaGloria. Construction work is expected to be started within the next six months.

WABASH—The Missouri State Highway department has awarded a contract for the construction of a reinforced concrete viaduct to carry Page avenue over the tracks of the Wabash at St. Louis, Mo., to the Skrainka Construction Company, St. Louis, at a cost of about $254,000.

Financial

CENTRAL OF NEW JERSEY.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its branch line from Nolan's Point, N. J., to Ogden Mine, 9.69 miles.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a part of a branch line extending from Elmwood, Wis., to Weston, 8.9 miles.

FONDA, JOHNSTOWN & GLOVERSVILLE.—*Valuation.* — The Interstate Commerce Commission has issued a final valuation report as of 1927, finding the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $4,275,000.

INDIANAPOLIS UNION.—*Valuation.*—The Interstate Commerce Commission has issued a final valuation report as of 1927, finding the final value for rate-making purposes of the property owned and used for common carrier purposes to be $12,000,000, while the value of the property used but not owned was placed at $3,505,074.

LOUISIANA & ARKANSAS.—*Acquisition.*—The Interstate Commerce Commission has authorized this company to acquire the railroad properties of the Louisiana Railway & Navigation Co., extending from Shreveport, La., to New Orleans, 298.4 miles, with a branch line 0.9 mile long at Pineville. The L. & A controls the L. R. & N. through stock ownership and lease.

PACIFIC COAST.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon (a) a segment of a branch from Black Diamond station, Wash., to the end of the line, 3.9 miles, (b) its Kummer branch, 1.7 miles, and (c) a segment of its Newcastle branch from Briquetville to the end of the line, 6.3 miles.

TENNESSEE & CAROLINA SOUTHERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its entire line from Maryville, Tenn., to Calderwood, 30.5 miles.

Average Prices of Stocks and of Bonds

	Dec. 26	Last week	Last year
Average price of 20 representative railway stocks..	35.15	36.00	37.90
Average price of 20 representative railway bonds..	74.81	74.68	67.05

Dividends Declared

Allegheny & Western.—$3.00, payable January 1 to holders of record December 20.

Cayuga & Susquehanna.—$1.20, semi-annually, payable January 2 to holders of record December 20.

Cincinnati Northern.—$6.00, semi-annually, payable January 31 to holders of record January 21.

Northern Central.—$2.00 semi-annually, payable January 15 to holders of record December 31.

Richmond, Fredericksburg & Potomac.—Non-Voting, $2.00, semi-annually; Voting, $2.00, semi-annually; Dividend Obligations, $2.00, semi-annually, all payable December 31 to holders of record December 22.

Railway Officers

OPERATING

C. M. Moore, assistant chief of operations, Railroad Marine Service at New York, has been appointed chief of operations succeeding **T. C. Mulligan,** deceased.

TRAFFIC

W. E. Callender, general agent, passenger department, of the Chicago & Eastern Illinois, with headquarters at Chicago, has been appointed to the newly-created position of assistant passenger traffic manager, with the same headquarters.

MECHANICAL

Theodore Olson, traveling engineer of the Chicago Great Western, has been appointed general road foreman of engines, with headquarters at Oelwein, Iowa, this appointment having taken place December 1.

OBITUARY

W. O. Moody, mechanical engineer of the Illinois Central at Chicago, died suddenly on December 25.

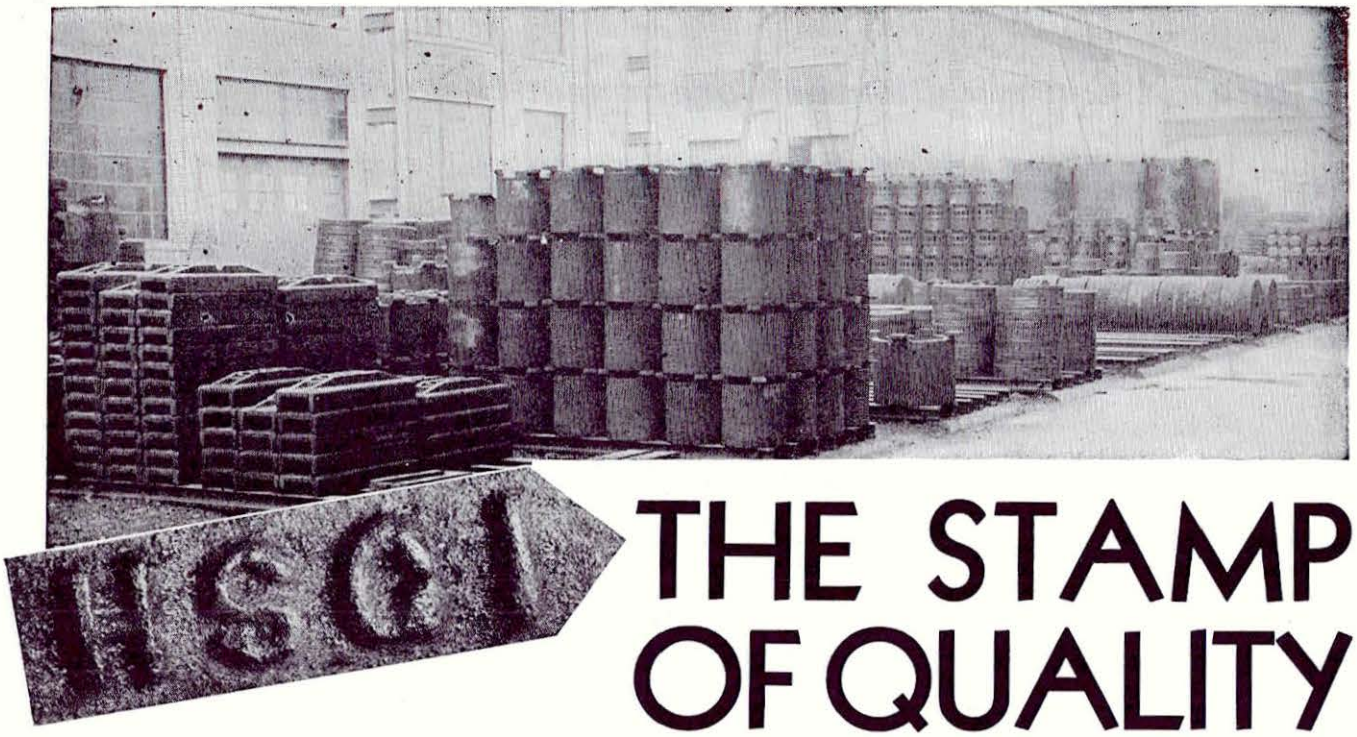
Fred J. Nannah, engineer maintenance of way of the Pittsburgh & Lake Erie at Pittsburgh, died on December 11.

E. L. Jansen, general agent at Minneapolis, Minn., for the Atchison, Topeka & Santa Fe, died on December 19 at Los Angeles.

E. Marvin Heberd, vice-president and a director of the Bolivia Railroad Company of South America, with headquarters at New York, died on December 24, at his home in Summit, N. J. Mr. Heberd was 65 years old.

Robert Thomas Morrow, retired assistant to the vice-president of the Central region of the Pennsylvania, died at his home in Shadyside, Pa., on December 12 after a short illness. Mr. Morrow retired in 1929 after almost 52 years of service with the Pennsylvania. He was 75 years old.

Frederick J. Griffith, general tax agent of the Baltimore & Ohio at Baltimore, Maryland, died on December 23 at the Johns Hopkins Hospital, Baltimore, after a short illness. Mr. Griffith was born on June 20, 1856, at Washington, D. C., and received his early education there and was graduated from the University of Maryland. Mr. Griffith entered railroad service with the Baltimore & Ohio in May, 1880, as a stenographer in the relief department and was later transferred to the president's office as a file clerk. In 1883 he became secretary to the assistant to the president and in 1887 he was appointed tax agent. In 1929 he was given the position of general tax agent of the entire Baltimore & Ohio system, which position he held at the time of his death.



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SERVICE between replacements is the only true measure of values — the materials which last longest are always the least expensive.

Many American railroads insist upon H S G I Castings for the vital parts of their locomotives.

This unusual endorsement proves that the qualities built into HUNT-SPILLER *Air Furnace* GUN IRON must meet all the requirements of economy and efficiency.

The uniformity of H S G I reduces machining costs—its wear-resisting properties insure maximum mileage between renewals with big savings in fuel and maintenance.

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Reg. U. S. Trade Mark

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Valve Packing Rings
Valve Bull Rings
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Hub Liners
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Cylinder Snap Rings
Valve Rings All Shapes

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Railroad Consolidation or Government Ownership?

W. W. Atterbury, President of the Pennsylvania Railroad, in a recent discussion of this subject stated:

"Certainly broad and bold consolidation would offer an infinitely preferable way out, and I reiterate the opinion that sooner or later we shall have to come to it if we are to avoid government ownership. . . ."

RAILROAD MERGERS

By JOHN WILL CHAPMAN, B.S., M.C.S.

Member of Investment Staff, United States Trust Company of New York; Formerly Statistical and Security Analyst for Standard Statistics Company

THIS timely new book deals with the causes, methods of effecting and results of railroad mergers. It is packed with facts of value to anyone concerned in any way with changes to be effected through the contemplated mergers of American railroads into large competing systems.

WHAT REVIEWERS SAY

"It weighs the respective merits of the more recent type of regional consolidations and the older end-to-end type, and it attempts to gather, sift, and summarize in an orderly way the more important discussions of rail merger problems."—*Barron's.*

"A close student of the railroads, Mr. Chapman has assembled in this timely book a great deal of general statistical information, conveniently arranged, on the evolution of consolidations and unifications into the giant trunk lines of today."—*New York Daily Investment News.*

"The merger problem now confronting us is discussed in some detail with the probable benefits to be derived from the various proposals advanced by the Interstate Commerce Commission, and several others."—*The American Banker.*

"The author weighs the evidence on operating advantages and disadvantages, delves into the financial aspects, and explains the effect of mergers on the market action of railroad securities."—*Wall Street Journal.*

"The whole volume, including the appendices, forms a compact and convenient reference for those seeking data upon this live and disturbing transportation and financial problem—mergers." Professor G. Lloyd Wilson, University of Pennsylvania, in the *Annals of the American Academy of Political and Social Science.*

Some of the Features

Historical Survey—advantages and disadvantages of mergers before 1920.

Merger Problems Under the Transportation Act. Maintenance of competition—Maintenance of existing routes and channels of trade—Valuation of properties—Exact provisions of the Act concerning consolidations—Relation between consolidations and unifications—Exact provisions of Act concerning unifications—Amendments in 1933.

Special Problems. Holding companies—Short lines—Minority stockholders.

Progress of Mergers after Transportation Act. The record from 1920 through 1934—Proposed particular mergers—The I. C. C. Plan—The Four-System Plan of the Eastern trunk-lines.—Current proposals.

Operating and Financial Problems of Future Mergers. Operating advantages and disadvantages—Financial aspects—Effect of mergers on the market action of railroad securities.

Conclusion. Procedural and legislative problems of future mergers—Summary of the Prince-Barriger plan for railroad mergers.

Appendices and Bibliography.

170 pages, 28 merger maps, 6 x 9, cloth, $3.00

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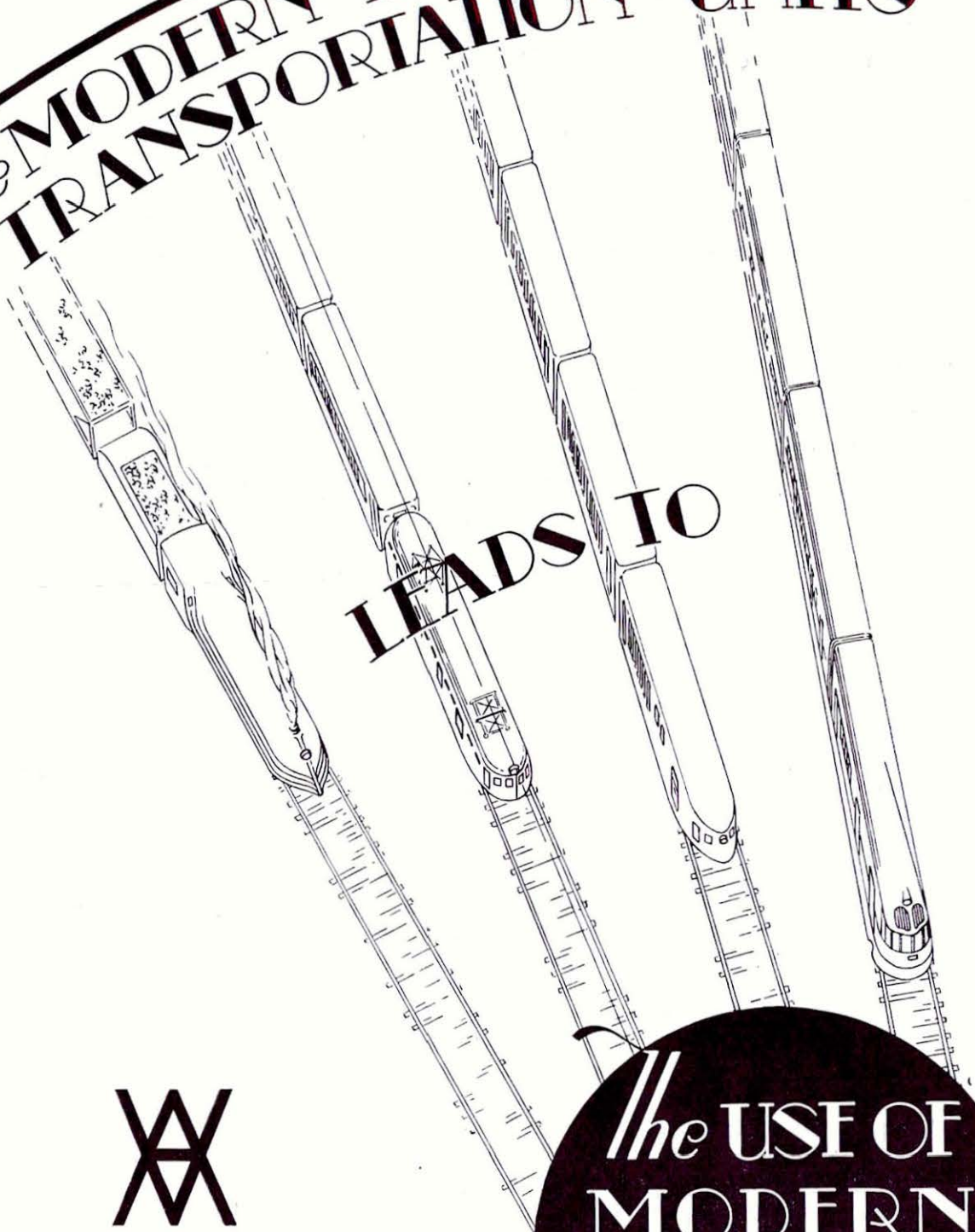

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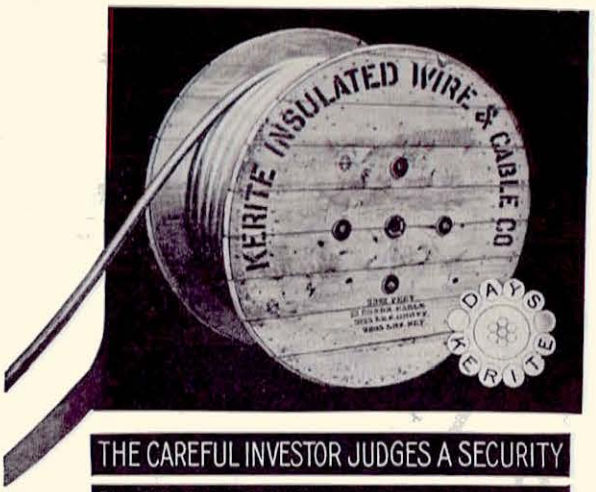

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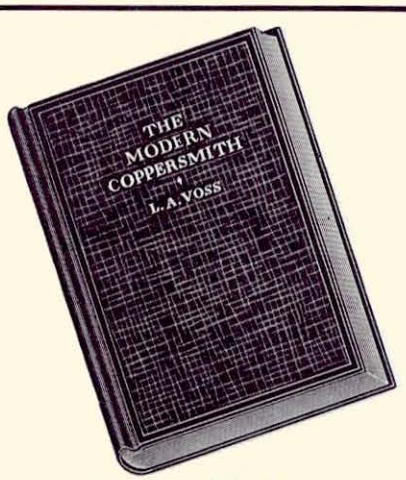

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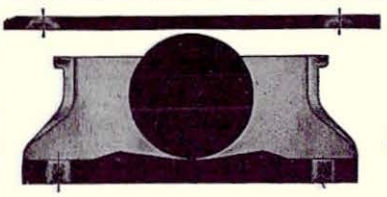

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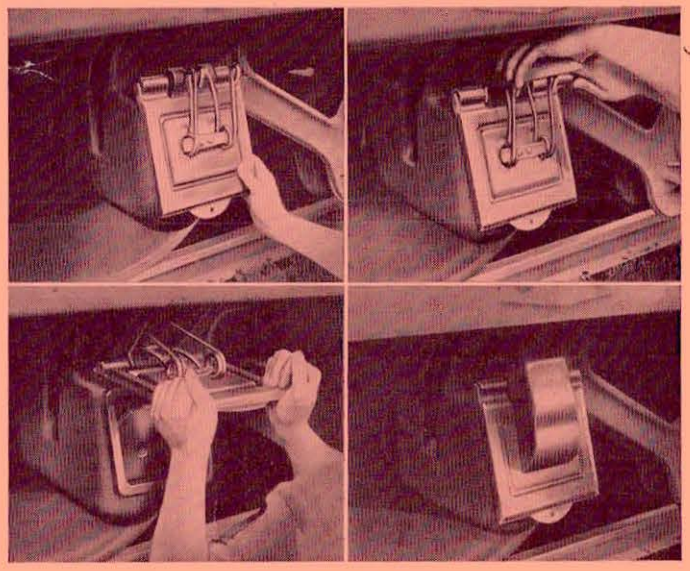

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